AN EVALUATION OF AN INTERVENTION FOR HPV RISK REDUCTION AMONG COLLEGE-AGED WOMEN

by

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ABSTRACT

JOCELYN BRINEMAN SWEENEY. A theory-based evaluation of an intervention for HPV risk reduction among college-aged women. (Under the direction of DR. RICHARD D. MCANULTY and DR. CHARLIE L. REEVE)

The goal of the study was to examine the effectiveness of a group intervention in reducing risk in relation to human papillomavirus (HPV) among sexually active, college-aged women. Using a randomized design, the current study examined the effectiveness of an HPV educational group intervention guided by previous sexual risk-reduction research and the Theory of Planned Behavior (TPB; Ajzen, 1991). The intervention was provided in a standard, in-person group format consisting of a single session. Measures were completed prior to the intervention, immediately after the intervention, and one month post-intervention (Fisher, 1997). Consistent with TPB (Ajzen, 2002), study outcomes included predicted changes in the following: 1) HPV knowledge, 2) attitudes towards risk-reduction behaviors (e.g., reducing new sexual partners, using barrier contraceptives, discussing STIs with partners, receiving HPV vaccine, seeking information on HPV, receiving a Pap smear, getting tested for HIV and other STIs), 3) subjective norms in association with the risk-reduction behaviors, 4) perceived behavioral control of the risk-reduction behaviors, 5) intention to perform the risk-reduction behaviors, and 6) the actual risk-reduction behaviors. Consistent with the hypotheses, the intervention was successful at increasing knowledge, behavioral intentions, HPV information-seeking and HIV testing and these changes were maintained over a one-month interval. Modest increases in attitudes toward risk-reduction behaviors, subjective norms, and perceived behavioral control were obtained immediately after the

intervention, but not at follow-up. Contrary to the hypothesized outcome, the intervention was also not successful at creating increases in social norms and many of the risk reduction behaviors (e.g., reducing new sexual partners, using barrier contraceptives, discussing STIs with partners, receiving HPV vaccine, receiving a Pap smear, getting tested for STIs). These findings do provide some empirical support for a brief one-time educational intervention in reducing the risk of an HPV infection.

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CHAPTER 1: INTRODUCTION

Since 1913, the control and prevention of sexually transmitted infections (STIs) has been a significant focus of public health officials in the United States (U.S.) and a common area of emphasis in health promotion programs (McGough & Handsfield, 2007). However, it was not until the 1980s that behavioral interventions became common practice (McGough & Handsfield, 2007). The goal of such health promotion programs, also referred to as risk reduction, is to diminish the risk of infection among populations considered to be at-risk as indicated by prevalence and incidence rates (Bennett & Hodgson, 1992). Typically, the interventions aim to reduce risk behaviors and increase risk-reduction behaviors (St. Lawrence & Fortenberry, 2007).

When determining at-risk populations, a primary method is to examine the rate of new infections among various populations. With regard to STIs, researchers have consistently demonstrated that adolescents and young adults have disproportionately high rates of STIs (Ethier & Orr, 2007). In fact, over half of all new STI infections are attributed to persons aged 15-24 (Centers for Disease Control [CDC], 2012e; Weinstock, Berman, & Cates, 2004).

There are many known behavioral risk factors for STIs among adolescents, including intercourse with multiple partners, intercourse with a sexual partner who has had multiple partners, first intercourse at an early age, infrequent condom use, lack of STI testing, and a history of STIs (CDC, 2010b; Daley et al., 2008; Denny-Smith, Bairan,

& Page, 2006). In the U.S., young adults tend to engage in multiple, brief monogamous relationships (Herbenick et al., 2010). Because these sequential relationships are relatively exclusive, these individuals consistently underestimate their risk of STI exposure while engaging in unprotected sexual intercourse with a number of individuals. Currently, over half the rate of new STIs occur in older adolescents even though they only account for 25% of the sexually active population (CDC 2010c). Results from a national study indicate that the rate of older adolescent STIs is growing rapidly and surpassing other age groups in STI infection rates (CDC, 2010c). The highest rate of growth is seen among young women (CDC, 2011) attributable, in part, to greater cervical ectopy in younger women (CDC, 2012e). Therefore, STI risk-reduction programs aimed at young women remain critically important (Hiltabiddle, 1996).

Human Papillomavirus

Human papillomavirus (HPV) is a virus that is spread through skin-to-skin contact, particularly genital contact. Given the ease of transmission and the inability of current barrier contraceptive methods (e.g., male condoms, dental dams, female condoms) to completely prevent transmission, HPV is the most common STI in the U.S. and is estimated to infect approximately 6.2 million individuals annually (CDC, 2010b). In fact, approximately 20 million Americans are currently infected (CDC, 2012a) and it has been reported that its lifetime prevalence in the U.S. is over 50% (CDC, 2010b). This is of particular concern given the known causal link between HPV and a number of problems, including anxiety, relationship distress (Ferris et al., 2008), genital warts and various cancers (CDC, 2010b; Parkin & Bray, 2006). Women are disproportionately impacted by HPV-related cancers. For example, cervical cancer affects over eleven

thousand women annually and results in over 4,000 deaths per year in the U.S. alone, making it one of the most common cancers among women (CDC, 2009a). The annual incidence rate of HPV-associated anal cancer among women is 2,700 compared to 1,500 among men. Approximately 1,500 women are diagnosed with HPV-associated vulvar cancer each year and another 500 women are diagnosed with HPV-associated vaginal cancer (CDC, 2012a).

While overall lifetime prevalence rates are high, research has demonstrated that certain factors are associated with elevated risks of infection with HPV. Specifically, HPV-risk behaviors include intercourse with multiple partners, intercourse with a sexual partner who has had multiple partners, first intercourse at an early age, infrequent condom use and lack of STI testing, a history of STIs (CDC, 2010b; Daley et al., 2008; Denny-Smith et al., 2006) and cigarette smoking (Koutsky, 1997; Vail-Smith & White, 1992). Further, it has been suggested that younger individuals, aged 15-24 are among the highest risk populations for HPV infection in the U.S. (CDC, 2012c) with an incidence rate of 4.6 million and prevalence rate as high as 9.2 million (Weinstock et al., 2004). The financial impact of HPV among this age group is more than the cost of genital herpes and hepatitis B combined and equal to the cost of HIV (Steben & Duarte-Franco, 2008). According to researchers (Dell et al., 2000; Ingledue, Cottrell, & Bernard, 2004; Lambert, 2001; Vail-Smith & White, 1992), the college student population (late teens to early 20s) is at an even higher risk (CDC, 2012d), accounting for approximately 74% of the HPV infections in the U.S. (CDC, 2009b), which is often attributed to the abundance of potential partners and associated sexual risk behavior (Burak & Meyer, 1997; Denny-Smith et al., 2006; D'Urso, Thompson-Robinson, & Chandler, 2007; Lopez & McMahan,

2007). This is especially relevant to women, as indicated by incidence rates of HPV among college women ranging from 43 to 60% (Fernández-Esquer, Ross, & Torres, 2000) and infection rates as high as 45% among women aged 20-24 (Dunne et al., 2007), making it the most common STI among young women (Forhan et al., 2008). Therefore, when discussing risk factors for HPV infection, a necessary category of risk to examine includes a wide variety of social, biological, and environmental factors.

HPV Vaccine

Currently, there are two vaccines available for use among women (Gardasil® and Cervarix®). Gardasil®, a quadrivalent vaccine that is licensed for use among women and men age 9-26, protects against two types of HPV known to cause cervical cancer (16, 18) along with two HPV types that cause genital warts (6 and 11) (CDC, 2012c; Liddon, Zimet, & Stanberry, 2007). Cervarix® is a bivalent vaccine licensed only for women age 10-25 (CDC, 2012c) that protects against types 16 and 18. Both vaccines are delivered in a 3-dose series and recommended prior to the onset of sexual activity (for a review of HPV vaccines see www.cdc.gov/std/hpv/monitoring-rpt.htm). Research indicates that, despite the availability of the vaccines, current rates of vaccination are surprisingly low. In a sample of 409 women aged 13-26, 5% had started the vaccination series (Kahn et al., 2008) and only .2% had completed the entire series of three (Kahn et al., 2008). In a sample of 1,401 college women, the completed rate of vaccination was 14% (Allen et al., 2009), indicating that a significant portion of the higher risk population is not receiving the vaccine, possibly due to perceived barriers to vaccination (e.g., cost and side-effects) (Conroy et al., 2009; Zimet, Weiss, Rosenthal, Good, & Vichnin, 2010). For example, the vaccine is delivered in a 3-dose series. The second dose must be received within 1-2

months of dose 1 while the third dose must be received within 6 months of dose 1 (CDC, 2012d). Additional barriers have included time constraints, availability, and access to low-income populations (Kahn et al., 2008). Moreover, given the high incidence rates of HPV, a person may already be infected with one of the 4 types of HPV that the vaccine was designed to prevent. Although it is highly unlikely they are infected with all four and therefore, will still receive some protection from the vaccine (Garland et al., 2007), they are not fully protected. Further, while the vaccine is effective in preventing two types of cancer-related HPV (types 16 and 18) it does not protect against all types of cancer-causing HPV (CDC, 2012d). For example, neither vaccine protects against the remaining 12 high-risk types which are associated with cervical lesions and anogenital (e.g., cervical) cancers. Thus, the rate of non-vaccinated women who are at-risk for infection in conjunction with the rate of females who are already infected and the additional high-risk HPV types not prevented with the vaccine makes it necessary to examine additional feasible methods of risk reduction for women while concurrently promoting the HPV vaccination (Daley et al., 2008).

A general lack of knowledge regarding sexual risk behaviors and risk-reduction methods increases risk for HPV (Dell et al., 2000; Lambert, 2001; Vail-Smith & White, 1992; Yacobi, Tennant, Ferrante, Pal, & Roetzheim, 1999). Although the FDA's approval in 2006, of a vaccine (Gardasil®) to prevent four types of HPV for women ages 9-26 resulted in a surge of information about HPV (Daley et al., 2008), several studies revealed that most individuals had very little knowledge about HPV prior to the Gardasil® media campaign led by Merck (Dell et al., 2000; Denny-Smith et al., 2006; Lambert, 2001; Yacobi et al., 1999). In fact, Vail-Smith and White (1992) found that

only 13% of their sample of 323 participants had heard of HPV. While an increase in knowledge has occurred since the release of the vaccine, (Daley et al., 2008; Gerend & Magliore, 2008; Lopez & McMahan, 2007), there are still large gaps in the level of knowledge, and many young adults remain uninformed (Lopez & McMahan, 2007). Only one-third of the 351 college students surveyed by D'Urso and colleagues (2007) were aware of HPV. In a study conducted by Gerend and Magloire (2008), 75% of their sample of 124 university students had heard of HPV and a significant portion demonstrated a clear understanding of the link between HPV and cervical cancer; however, only 45% of respondents perceived themselves to be at risk of being infected with HPV. Similarly, 76% of women in a study conducted by Pitts and colleagues (2010) were aware that HPV causes cervical cancer, but only 44% were aware of how HPV is transmitted. Therefore, while gains have been made in terms of awareness of HPV since the release of Gardasil®, many individuals are still demonstrating insufficient levels of knowledge regarding transmission and impact of an HPV infection. Many young adults remain unaware of this health threat and associated risk factors which, in turn detracts from risk reduction.

One main reason behind the problems with accurately estimating HPV exposure risks is a lack of knowledge regarding the behaviors that place them at risk (e.g., avoidance of testing, sex with multiple partners) and the ease in which HPV is transmitted (Lambert, 2001). Therefore, these individuals are at an increased risk for the consequences of infection (e.g., cervical cancer) because they are unaware of their infection and subsequently are unlikely to seek treatment, and they remain at risk of spreading the infection to sexual partners. Research has shown that individuals often lack

understanding of, or have negative attitudes toward, HPV testing. For example, in a qualitative study conducted by McCaffery and colleagues (2003), a majority of women reported a fear of testing due to the stigma associated with HPV. Dell and colleagues (2000) also found that understanding of testing methods was low (for a review of HPV testing methods see www.cdc.gov/std/hpv/pap/default.htm). An additional reason for the reluctance to being tested seems to be that many individuals grossly underestimate their risk of infection. At- risk groups, including those who initiate intercourse at an early age and those with multiple sexual partners, consistently underestimate the likelihood that they have been exposed to HPV (Burak & Meyer, 1997; Dell et al., 2000; Ferris et al., 2008).

Given the widespread lack of knowledge and misinformation about HPV, it is not surprising that many individuals are unaware of risks and related factors (Vail-Smith & White, 1992; Yacobi et al., 1999). Dell and colleagues (2000) found that only 35% of sexually active participants considered themselves at risk, indicating that a significant number of young adults are actually underestimating their risk despite the fact that they are engaging in the number one high risk sexual behavior associated with infection: sex.

HPV Risk Reduction Interventions

Current research examining the impact of HPV risk reduction interventions has focused on vaccine acceptability and use (Chapman et al., 2010; Cox, Cox, Sturm, & Zimet, 2010; Reiter, Stubbs, Panozzo, Whitesell, & Brewer, 2011) or HPV-knowledge (Lambert, 2001). For example, Chapman et al. (2010) examined the impact of an educational video to increase acceptability of the HPV vaccine. Prior to watching the video, participants completed a 32-item survey to gather demographic information, HPV

knowledge and beliefs, and attitudes towards the HPV vaccine. The video included information about HPV, including prevalence and transmission, along with information about the vaccine. After watching the video, participants completed an 11-item survey. A total of 186 women between the ages of 18 and 60 completed pre-test, media intervention, and post-test. The results indicated that vaccine acceptability increased from 66.7% prior to the video to 78% after watching the video. The authors did not assess improvements in knowledge about HPV and no comparison group was used to determine the effectiveness of this intervention modality over others.

Lambert (2001) conducted a study examining the impact of an educational intervention on the knowledge of HPV. A total of 60 undergraduate students, a combination of two classes, were given a 12-item measure assessing their knowledge of HPV and other STIs. One class was designated the control class while the other was assigned to the intervention condition. Following completion of the measure, the intervention group received a brief, single HPV information-session (e.g., prevalence, association with cervical cancer). Three months after the intervention, all students in both conditions completed 9-item follow-up measure to assess knowledge retention. Across both groups, knowledge on pre-test measures was lower for HPV than other STIs, with the highest amount of knowledge found for HIV. Following the intervention, knowledge regarding HPV was highest in the intervention group suggesting that the educational intervention was effective and produced relatively long-term effects (Lambert, 2001). However, given the lack of assessment of sexual behaviors, no information is available regarding the impact of the intervention on actual risk reduction.

Given the minimal amount of research examining the impact of HPV interventions on behavior change aside from vaccine use, it is useful to examine intervention efforts in other related fields to gain information about potential strategies. A number of STI risk-reduction interventions have shown great promise.

Group Interventions

Group interventions are the most common method of intervention used for STI risk reduction in the U.S. (St. Lawrence & Fortenberry, 2007) because they can be delivered to multiple participants, at a fraction of the cost and time of individual interventions (Gift & Marrazzo, 2007). Additionally, in open group formats, individuals benefit from other group members' inquiries, thereby furthering the depth or richness of the information they receive (McCree, Eke, & Williams, 2007). According to Babouri (1985), group interventions can efficiently convey factual information while challenging the group members to integrate the information into their own "value systems" (p. 328). A review of STI interventions by Neumann and colleagues (2002) indicated that group interventions have been shown to be more effective than individual interventions in reducing sexual risk behaviors such as increased condom use and a decrease in the number of new sexual partners.

According to St. Lawrence and Fortenberry (2007), interventions should be comprehensive and "provide information, encourage abstinence, promote condom use for those who are sexually active, encourage fewer sexual partners, and transmit sexual communication skills" (p.44). A considerable body of research examining the efficacy of group STI risk-reduction interventions has focused primarily on HIV risk reduction (Shepherd, Peersman, Weston, & Napuli, 2000). A number of these studies have yielded

promising results (DiClemente, Salazar, & Crosby, 2007; Jemmott & Jemott, 2000; Wingood & DiClemente, 1996), especially in behavioral outcomes such as condom use (Robin et al., 2004) which is a primary goal of HIV interventions. For example, Jemmott and Jemmott (2000) reviewed 36 interventions focusing on risk reduction for HIV, six of which took place on college campuses. Almost all of the studies included a follow-up that was conducted 6-months or less following treatment completion. Based on the results of this review, the researchers determined that theory-based, group interventions were effective at increasing HIV knowledge and self-efficacy for behavior change while also reducing sexual risk behaviors.

In another review article by Wingood and DiClemente (1996), the researchers concluded that interventions that combined a skills component (e.g., risk-reduction methods and proper condom use) and an information component (e.g., transmission and sexual risk behaviors) were more effective than interventions that contained information only, indicating that interactive and comprehensive interventions are most effective. For example, Farrell and colleagues (2008) found that a risk-reduction group intervention for college students which focused on a combination of cognitive and behavioral skills to increase risk-reduction self-efficacy was effective in significantly increasing participants' risk-reduction behaviors such as discussing STI testing and history with sexual partners along with purchasing and using condoms. At follow-ups (1 and 2-4 months), participants maintained an increased knowledge of risk factors and general facts about HIV, an established mediator of risk reduction (Jemmott & Jemmott, 2000).

In a similar study, Belden and colleagues (2008) evaluated an AIDS risk-reduction intervention targeted at higher-risk teens aged 12-16 years. The intervention

consisted of three 90-minute sessions focusing on strengthening self-efficacy with regards to sexual decision-making, effective communication with partners, and condom use. Additionally, information about HIV/AIDS risk reduction was provided. Although the results indicated that knowledge gain and self-efficacy were higher one month post-treatment, instances of unprotected sex did not differ between the treatment and control groups, suggesting that self-efficacy interventions alone may not be sufficient in changing sexual risk behavior.

Bryan et al. (1996) conducted a study examining the impact of a single-session intervention focusing on condom use among women. The intervention group received a 45-minute presentation focusing on safer sex consisting of video segments, lecture, discussion, and skill building. All participants completed pre-test and immediate post-test measures along with follow-up measures at 6-weeks and 6-months post-intervention. As the authors had predicted, the intervention group demonstrated increased intentions to use condoms immediately following the intervention compared to their pre-test intentions. Further, their reported condom use had significantly increased at both the 6-week and 6-month follow-ups, demonstrating the long-term impact of a single-session group.

HPV and Theory: The Theory of Planned Behavior

Dworkin and colleagues (2006) recommended that successful interventions should be theoretically-based and gender specific. Additionally, STI risk-reduction interventions for women should incorporate additional methods of protected sex beyond male condom use. They noted that women should be empowered with options such as "outer course, female condoms, refusal, and leaving a sexual encounter or relationship

that was not amenable to safe sex negotiations" (Dworkin, Exner, Melendez, Hoffman, & Erhhardt, 2006, p. 43).

A number of behavioral theories in the field of STI risk-reduction research maintain that in order for a person to engage in certain risk-reduction measures, she must possess the beliefs that will encourage her to do so. Unfortunately, individuals who inaccurately perceive degree of risk for HPV are less likely to avoid sexual risk behaviors or engage in preventive behaviors, resulting in a higher risk of infection (Ingledue et al., 2004). Therefore, interventions targeting a change in the inaccurate beliefs and their influence on actions are necessary in order to prevent HPV infection. Current STI interventions often rely solely on providing information about the infections with the goal of reducing risk through increased knowledge alone (St. Lawrence & Fortenberry, 2007). Researchers agree that knowledge of a health behavior and its outcomes are necessary in order to initiate behavior change (Jeste, Dunn, Folsom, & Zisook, 2008). However, research has failed to demonstrate that solely providing information (e.g., pamphlet) will lead to a change in risk-reduction behavior (Shepherd et al., 2000; St. Lawrence & Fortenberry, 2007).

As reported by previous researchers (Dworkin et al., 2006; Jemmott & Jemmott, 2000), theory-based group interventions are the most effective interventions for HIV and STI risk reduction. The Theory of Planned Behavior in particular (TPB; Ajzen, 1991) has been influential in providing a framework for designing effective interventions. A significant amount of research supporting this model has been conducted on a variety of health behaviors, including sexual risk behaviors (Armitage & Conner, 2001; Hardeman et al., 2002). An extension of the Theory of Reasoned Action (TRA; Ajzen & Fishbein,

1980), TPB is a cognitive theory developed to assist in the explanation of behavioral action and behavior change. TPB proposes that behavior is primarily influenced by behavioral intentions. These intentions are influenced by an individual's beliefs about a behavior, including the consequences (behavioral beliefs), which in turn foster attitudes towards the behavior. Further, intentions are influenced by an individual's perceptions of others' beliefs (normative beliefs) (Ajzen, 2002) which shape their perception of social pressure to engage in the behavior (subjective norms). Lastly, TPB proposes that an individual's intentions are influenced by beliefs about barriers or aids that may encourage or impede performance of the behavior" (control beliefs) (Ajzen, 2002) which then lead to one's perceived ability to engage in the target behavior (perceived behavioral control). It is the additive nature of the three behavioral influences mentioned (attitude toward the behavior, subjective norm, and perceived behavioral control) that forms the behavioral intention – "the central factor in the theory of planned behavior" (Ajzen, 1991, p. 181). In other words, in order for an individual to engage in a risk-reduction behavior such as condom use, she must have the knowledge and information necessary to develop beliefs that would support behavioral intentions about condom use.

For example, she must have the belief that using condoms would be effective at reducing her risk of negative consequences, which would lead her to have a positive attitude towards condom use. She must also have information supporting a social expectation for condom use or believe that the majority of her peers use condoms. This would lead her to perceive a significant amount of social pressure to use condoms. Lastly, she must be knowledgeable about the possible impediments to condom use (e.g., partner cooperation; proper condom use) and how to address those problems, allowing

her to believe she possesses the skills necessary to negotiate condom use with a partner and properly use a condom. If these factors are in place, the individual is more likely to be motivated to use a condom.

It is this motivation (i.e., intention to behave), according to TPB that will lead to consistent condom use (Ajzen, 1991; Albarracin, Johnson, Fishbein, & Muellerleile, 2001). Therefore, interventions based on TPB must focus on changing the behavioral, normative, and control beliefs of participants by providing the information, skills, and problem-solving strategies (Hardeman et al., 2002). By altering beliefs, changes in attitudes, in subjective norms, and in perceived behavioral control can then occur (Ajzen, 1991; Fisher, 1997). Research examining the impact of HIV behavioral interventions based on TPB has generally upheld its theoretical assumptions and demonstrated that these interventions are effective at increasing risk-reduction behaviors such as reducing the frequency of sex with multiple partners (Jemmott, Jemmott, & Fong, 1998) and unprotected sex (Albarracin, Durantini, & Earl, 2006; Jemmott et al., 1998; Jemmott, Jemmott, Fong, & Morales, 2010).

Given the overlap between HIV and HPV sexual risk behaviors believed to contribute or lead to infection, HPV interventions could borrow components from HIV programs that are proven effective (McCree et al., 2007), such as encouraging regular STI/HIV testing and discussing STIs/HIV with new partners (Burk, et al., 1996; Dell et al., 2000; Gerend & Magliore, 2008). In addition, programs incorporating a focus on abstinence or reduction in new sexual partners are more effective in preventing HIV than those that do not promote this strategy (DiClemente et al., 2007). Condom use is a known risk-reduction strategy against HIV infection (CDC, 2010a). Although condoms

do not completely protect against HPV infection (CDC, 2010a; Winer et al., 2006), studies have shown that condom use can significantly reduce risk of infection (CDC, 2010a). Additionally, consistent condom use has been correlated with faster recovery from infection and a sireduced likelihood of re-infection (Bleeker, et al., 2003; Hogewoning et al., 2003; Holmes, Levine, & Weaver, 2004). Similar to HIV intervention programs, HPV intervention programs should emphasize the importance of frequent STI testing and Pap smears, discussing STIs with new partners, abstinence or a reduction in the number of sexual partners (Baer, Allen, & Braun, 2000; Yacobi et al., 1999), and proper barrier contraceptive use (Hogewoning et al., 2003; Holmes et al., 2004). Additionally, the consequences of the infection such as cervical and other cancers (e.g., vulva, vagina, anus, and neck), and the necessary medical treatments, should be addressed (Baer et al., 2000; Yacobi et al., 1999).

In conclusion, although many components of traditional HIV interventions appear very applicable to HPV risk reduction, there are some differences that may require special adaptations for HPV risk-reduction interventions (Baer et al., 2000). For example, although condoms are less effective in reducing HPV infection than with other STIs, they do significantly reduce infection risks (McCaffery et al., 2003; Winer et al., 2006). Likewise, interventions must emphasize the prevalence and ease of transmission of HPV. HPV educational campaigns and interventions should target women (Baer et al., 2000) given the higher rate of serious health consequences and fatality attributed to HPV among women (Ferris et al., 2008; Lopez, Tanjasiri, & McMahan, 2008; Parkin & Bray, 2006). Lastly, it is important to note the effectiveness of the vaccine in prevention of the four types of HPV associated with cervical cancer and genital warts (Zimet et. al, 2010)

while addressing the barriers, including (but not limited to) beliefs and lack of access, that often prevent women from receiving this vaccination (Gerend & Magloire, 2008; Liddon et al., 2007; Zimet et al., 2010).

With these additions, current HIV group interventions might easily be translated into effective HPV group interventions.

Present Study

Given the high rate of infection among college women and associated consequences of HPV, it is necessary to gain a more thorough understanding of the most effective ways to reduce the risk of HPV infection. Currently, there is little information regarding the effectiveness of HPV risk-reduction interventions. By developing an effective, theory-based intervention, health care providers and educators should be more successful in their efforts to intercede and prevent infection with HPV or, if already infected, prevent more negative consequences (e.g., infecting others) from occurring.

Using a randomized design, the current study examined the effectiveness of an HPV educational group intervention developed for this study that was based on previous HIV and HPV risk-reduction research and guided by the principles of TPB (Ajzen, 1991) compared to a control condition. The intervention was provided in a standard, in-person group format (see Chapter 2 for more information about the intervention). The control condition consisted of participants viewing an academic skills building video. As suggested, the intervention targeted women given the high rate of infection, ease of transmission, and impact of cervical cancer among women (Baer et al., 2000; Ferris et al., 2008; Lopez et al., 2008). Additionally, only sexually active (e.g., anal, oral, and/or vaginal sex within the past month) women were included in the study to ensure that the

effects of the intervention on risk reduction could be exemplified by demonstrating a change in sexual risk-reduction behavior in addition to knowledge. Lastly, the study only included women who had not begun or completed the HPV-vaccine series to determine the impact of the intervention on this outcome.

Measures were completed prior to the intervention, immediately after the intervention, and one month post-intervention (Fisher, 1997). All participants completed all pre-test and post-test measures in the lab. Follow-up measures were completed outside of the lab, on participants' personal computers or any computer of their choice. Attrition rates were expected to be consistent with previous comparable interventions using a 1-6 month follow-up (Kamb et al., 1998; Petersen, Albright, Garrett, & Curtis, 2007; Robin et al., 2004) in the range of 15% to 35%.

Study Outcomes

The evaluation of the program effectiveness was informed by TPB (Ajzen, 2002). As stated in TPB (Ajzen, 1991), behaviors are directly influenced by an individual's intention to engage in that behavior (behavioral intentions). Behavioral intentions are influenced by the individual's beliefs about a behavior which are developed through information and knowledge, attitudes towards the behavior, her level of perceived social pressure for engaging in the behavior (subjective norms), and her perception of control for the behavior (perceived behavioral control). Therefore, the anticipated outcomes of the study included changes in the following: 1) HPV knowledge, 2) attitudes towards sexual risk-reduction behaviors (e.g., reducing new sexual partners, using barrier contraceptives, discussing STIs with partners, receiving HPV vaccine, seeking information on HPV, receiving a Pap smear, getting tested for HIV and other STIs), 3)

subjective norms in association with the risk-reduction behaviors, 4) perceived behavioral control of the risk-reduction behaviors, 5) intention to perform the risk-reduction behaviors, and 6) the actual risk-reduction behaviors.

Specific Aim and Hypotheses

The study was an exploratory study developed in order to advance the field of sexual risk reduction with regards to HPV. The goal of the study was to examine the effectiveness of a group intervention in sexual risk-reduction behaviors specific to human papillomavirus (HPV) among college-aged women. The intervention was a single-session group intervention based on previous HIV and HPV risk-reduction research and guided by the principles of TPB (Ajzen, 1991). The measured outcomes corresponded to the factors associated with behavior change according to TPB (Ajzen, 1991; Francis et al., 2004). Participants completed outcome measures pre-intervention, immediately post-intervention, and at a one-month follow-up. The multiple time points, along with a control group, were designed to allow the impact of the intervention to be assessed both between and within groups. The specific aims of the study were as follows:

Aim. To determine the effectiveness of the intervention on HPV risk reduction consistent with TPB (Ajzen, 1991) by:

a) Examining changes in participants' scores on non-behavioral indicators (e.g., knowledge, intentions, attitudes, social norms, and perceived control) from pre-test (T1) to immediate post-test (T2).
    a. Hypothesis 1: From T1 to T2, it was expected that scores on knowledge, intentions, attitudes, social norms, and perceived control for participants in

the intervention condition would show a significant increase over baseline levels compared to the control group.

b) Examining changes in participants' scores on non-behavioral indicators from T2 to one-month post-intervention (T3).
    a. Hypothesis 2: Participants' scores on knowledge, intentions, attitudes, social norms, and perceived control were expected to remain consistent from T2 to T3.

c) Examining changes in participants' scores on non-behavioral indicators from T1 to T3.
    a. Hypothesis 3: It was expected that scores on measures of knowledge, intentions, attitudes, social norms and perceived control would increase significantly from T1 to T3 for participants in the intervention condition whereas those in the control condition will not.

d) Examining changes in participants' sexual risk-reduction behaviors from T1 to T3.
    a. Hypothesis 4: From T1 to T3, it was predicted that risk-reduction behaviors (e.g., reducing new sexual partners, using barrier contraceptives, discussing STIs with partners, receiving HPV vaccine, seeking information on HPV, receiving a Pap smear, getting tested for HIV and other STIs, abstaining from cigarette use) would increase for participants in the intervention condition.

CHAPTER 2: MATERIALS AND METHOD

Participants

Participants were undergraduate students enrolled in undergraduate psychology courses at a state-supported university in the southeastern U.S. Eligibility criteria for the study required that participants were English-proficient females aged 18-24. Additionally, only participants who had engaged in oral, anal, and/or vaginal sex in the previous month were recruited. Participants who had begun or completed the HPV-vaccine series were ineligible.

Participants were recruited through the university's online recruiting website that was developed by SonaSystems®, a site monitored and maintained by a university psychology faculty member. A brief description of the study, emphasizing the necessary one-month follow-up, was placed on the site (see Appendix B). Pre-screen questions (see Appendix C) prevented ineligible participants from being able to view the study description and sign up for participation. To maximize recruitment and retention, participants received two credits towards their course requirements for completion of the first phase of the study. Upon completion of the follow-up, participants received an additional course credit and entry into a drawing to win one of ten $50 Target gift certificates, resulting in a one in twelve chance of winning a gift certificate.

Based on power analysis using GPower (Faul, Erdfelder, Lang, & Buchner, 2007) calculations to detect a medium effect (f^2=.15), the inclusion of n = 43 per condition, and

N = 86 would allow sufficient power (.80; alpha = .05) to detect the effect of the intervention. To accommodate for an estimated 15% to 35% attrition rate (Kamb et al., 1998; Petersen et al., 2007; Robin et al., 2004), the targeted sample size was *N* = 116 (*n* = 58 per condition). To maximize retention, participants were contacted 21 days following their participation in part one of the study by e-mail. Participants were contacted once again 28 days after completing part 1 of the study and instructed to sign-up on UNCC SonaSystems® and complete part 2 of the study. Participants who failed to complete follow-up measures within 31 days following participation in part 1 of the study were dropped from the study.

Sample

The original sample consisted of 105 female undergraduate students, primarily Caucasian, ranging from age 18 to 29. Prior to participating in the study, participants were randomly assigned to the intervention group (n=58) or the control group (n=47). A total of 14 participants failed to complete the follow-up (T3) portion of the study, resulting in an attrition rate of 13.33% (18.9% from the control group, 6.4% from the intervention group). Based on exclusion criteria, 9 participants (4 from the intervention condition; 5 from the control condition) were removed due to their sexual history (e.g., not sexually active in the past month), age (e.g., over 24 years old), relationship status (e.g., married), or failure to report their sexual orientation.

The final sample included 82 female undergraduates with 42 participants in the control group and 40 participants in the intervention group. Mean age of participants was 20.00 years (SD = 1.57) with a range of 18 to 23. The sample consisted of 21 (25.6%) freshman, 23 (28%) sophomores, 20 (24.4%) juniors, 16 (19.5%) seniors, and 2 (2.4%)

post-baccalaureate students. Participants primarily identified as Caucasian (56.1%) or African-American (28%). The remaining participants identified as bi-racial (9.8%), Asian-American (3.7%), or Latina (2.4%). With regards to relationship status, 22% of participants were unmarried and not dating and 19.5% were dating one or more people, 47.6% were in a relationship but not cohabitating, 11% were living with a partner but not married. Among the 48 participants reportedly in a relationship, 56.3% had been in that relationship for over a year. The majority (91.5%) of participants identified as heterosexual, while the remaining participants identified as either bisexual (7.3%) or other (1.2%). Forty-three percent of participants reported hormonal contraceptive use. There were no significant differences across groups in terms of age, race, education level, relationship status, relationship length, and sexual orientation based on analysis of the 82 valid cases.

Measures

Participants completed measures at three time points: pre-test (T1), post-test (T2), and follow-up (T3). Measures at T1 and T3 took approximately 15-30 minutes to complete while measures at T2 took approximately 5-10 minutes to complete. Pre-test measures (T1; Appendix D) were given immediately prior to the initiation of the condition in order to assess baseline levels of targeted outcomes: 1) HPV knowledge, 2) attitudes towards risk-reduction behaviors, 3) subjective norms in association with the risk-reduction behaviors, 4) perceived behavioral control of the risk-reduction behaviors, 5) intention to perform the risk-reduction behaviors, and 6) the actual risk-reduction behaviors. Post-test measures (T2; Appendix E) were given immediately following the completion of the intervention condition in order to determine the immediate impact of

the intervention on the targeted outcomes. Lastly, follow-up measures (T3; Appendix D) were administered one-month after completion of Part 1 to determine the long-term impact of the intervention on the targeted outcomes.

Identifier. All participants were asked to provide an identifier at each assessment point in order to link all three time points for analysis. Participant identifiers consisted of the first three letters of their middle name, the first three letters of their birth city, and the first three letters of their mother's maiden name, resulting in a 9-letter code.

Demographics. Participants were asked to report their age, ethnicity/race, sexual orientation, education level, and relationship status (Herbenick et al., 2010; Lambert, 2001). This measure was collected at T1 and T3 (see Appendix D).

HPV Knowledge Scale (HKS). Participants were instructed to complete Daley and colleagues' (2008) 20-item HPV Knowledge Scale assessing their knowledge of HPV with regard to the consequences (e.g., "HPV causes herpes"), causes (e.g., "HPV is spread on toilet seats"), identification (e.g., "You can have HPV without knowing it"), and control (e.g., "Using a condom will decrease the chance of transmitting warts") of HPV. Participants responded to the scale by choosing "True," "False," or "Not Sure (1)." Certain items were reverse scored such that "2" indicated correct, "1" indicated not sure, and "0" indicated incorrect. Item scores were averaged to determine knowledge of HPV as indicated by this measure. Higher scores indicate higher levels of knowledge with the highest possible score of 2. Daley and colleagues (2008) reported a split-half reliability coefficient of .806. Using the Spearman-Brown correction, the split-half reliability was assessed for each time point in this study: T1 (.716), T2 (.804) and T3 (.637).

Future Intentions Survey (FIS). Participants completed a 10-item survey developed from previous research (Bryan et al., 1996; Burak & Meyer, 1997; Farrell et al., 2008; Fisher, Fisher, Misovich, Kimble, & Malloy, 1996; Francis et al., 2004; Lopez & McMahan, 2007; McPartland, Weaver, Lee, & Koutsky, 2005) to examine the likelihood of engaging in specific risk-reduction behaviors (e.g., reducing new sexual partners, using barrier contraceptives, discussing STIs with partners, receiving HPV vaccine, seeking information on HPV, receiving a Pap smear, getting tested for HIV and other STIs). Responses were provided using a 3-point Likert scale (e.g., "To what degree do you in intend to use condoms with a new sexual partner in the next month?": I do not intend to [0], undecided [1], and I intend to [2]). Item scores were averaged to determine intentions to engage in sexual risk-reduction behaviors. The highest possible score was 2, with higher scores indicating greater intentions to perform the risk-reduction behaviors. Cronbach's alphas for the time points of T1, T2, and T3 were .645, .749, and .752, respectively.

Attitudes Toward Intentions (ATI). Participants completed a 20-item survey designed to assess participants' attitudes towards the behavioral intentions assessed in the FIS (Francis et al., 2004) (e.g., "Reducing the number of sexual partners I have is"; "Engaging in unprotected vaginal intercourse is"). Responses were provided using a 3-point Likert scale (e.g., "good," "neither good nor bad," "bad"; "harmful," "neither harmful nor beneficial," "beneficial"). Certain items were reverse scored. Item scores were averaged, with higher scores (highest possible score of 2) indicating more positive attitudes towards risk-reduction behaviors (e.g., reducing new sexual partners, using barrier contraceptives, discussing STIs with partners, receiving HPV vaccine, seeking

information on HPV, receiving a Pap smear, getting tested for HIV and other STIs). This assessment was used at all time points (i.e., T1, T2, and T3) and Cronbach's alphas for each of the time points were .775, .678, and .797, respectively.

Subjective Norms (SN). Participants completed a 10-item survey designed to assess the level of social pressure they experience in relation to performing the risk-reduction behaviors assessed in the FIS (Francis et al., 2004) (e.g., "I feel under social pressure to use a condom with a partner"; "I feel under social pressure to reduce the number of new sexual partners I have"). Responses were provided using a 5-point Likert scale (e.g., 0-4; "Strongly disagree" to "Strongly agree") with higher scores indicating greater perceived social pressure to engage in the behaviors assessed (e.g., reducing new sexual partners, using barrier contraceptives, discussing STIs with partners, receiving HPV vaccine, seeking information on HPV, receiving a Pap smear, getting tested for HIV and other STIs). Certain items were reverse scored. Item scores were averaged to create the scale sore (0-4). Cronbach's alphas for each of the three time points (i.e., T1, T2, and T3) were .754, .832, and .816, respectively.

Perceived Behavioral Control (PBC). Participants completed a 20-item survey designed to assess participants' perceived behavioral control for performing the risk-reduction behaviors assessed in the FIS (Francis et al., 2004). There are two scales comprising the measure with each scale consisting of 10 items. The first scale assessed participants' level of self-efficacy for performing the risk-reduction behavior (e.g., "I am confident that I can reduce the number of new sexual partners I have if I wanted to"). The second scale assessed participants' level of perceived controllability of the risk-reduction behavior (e.g., "Whether or not I reduce the number of new sexual partners I

have is entirely up to me"). Items were scored on a 5-point Likert scale (e.g., 0-4; "Strongly disagree" to "Strongly agree"). Certain items were reverse scored. Item scores were averaged with higher scores (highest possible score of 4) indicating greater perceived behavioral control for the risk-reduction behaviors (e.g., reducing new sexual partners, using barrier contraceptives, discussing STIs with partners, receiving HPV vaccine, seeking information on HPV, receiving a Pap smear, getting tested for HIV and other STIs). This assessment was used at all time points (i.e., T1, T2, and T3) and Cronbach's alphas for each of the time points were .894, .917, and .919, respectively.

Sexual Health and History Survey (SHHS). Participants were asked to answer seventeen questions about their sexual history (e.g., "How many opposite-sex vaginal intercourse partners have you had in your lifetime?"; "Approximately how many times have you received a Pap smear in your lifetime?"). Skip patterns were built into the measure such that depending on the participants' response, they were prompted to answer another series of questions. The total number of possible questions was sixty six, including both close-ended (e.g., "yes" or "no," "never" to "rarely") or open-ended (e.g., "How many times have you had oral sex with opposite-sex partners in the past 1 month?") with a minimum of 13 total responses. The questions were developed for this study and based on previous research assessments of sexual risk behavior associated with HPV (Burak & Meyer, 1997; Burk et al., 2006; Conroy et al., 2009; Dell et al., 2000; Gerend & Magliore, 2008; Ingledue et al., 2004; Sikstrőm, Hellberg, Nilsson, Brihmer, & Mardh, 1996; Vail-Smith & White, 1992; Winer et al., 2003) and other STIs/HIV (DiClemente et al., 2007; Gavin et al., 2009; McFarlane, Bull, & Reitmeijer, 2002; Peterson et al., 2007; Roberto et al., 2007). Given the wide range of responses due to the

built-in skip patterns, the items were assessed individually (Neumann et al., 2002) and no composite score was developed. The items of interest included the number of new sexual partners, the use of barrier contraceptives, discussion of STIs with sexual partners, receipt of the HPV vaccine, HPV-information seeking, receipt of a Pap smear, HIV testing, STI testing, and cigarette use. This assessment was used at both T1 and T3.

Intervention Design

Similar to Lambert (2001), the intervention condition consisted of a single session lasting approximately one hour. Guided by TPB (Ajzen, 2002), the aim of the intervention was to improve participants' knowledge, attitudes, subjective norms, and perceived behavioral control towards engaging in HPV risk-reduction behaviors (Fisher, 1997). According to TPB (Ajzen, 1991) creating positive change in those areas leads to an increase in participants' intention to engage in the HPV risk-reduction behaviors, thereby increasing the likelihood that the participants engage in the targeted HPV risk-reduction behaviors discussed in the intervention.

The intervention was facilitated by the principal investigator to the participants in a group session ranging from 2-7 group members per session. Power point slides along with facilitator led discussion provided a significant amount of basic, factual information about HPV (Jemmott et al., 2010). By providing such information, participants should be able to develop more accurate beliefs regarding HPV and HPV risk-reduction methods (Fishbein & Ajzen, 1975; Fisher, 1997; Hardeman et al., 2002). The methods of risk reduction included strategies such as limiting the number of sexual partners (DiClemente et al., 2007), alternative sexual activities (e.g., non-penetrative sexual acts), discussion of sexual history and testing with potential sexual partners (Baer et al., 2000), and

knowledge regarding HPV (Burchell, Winer, de Sanjosé, & Franco, 2006). Further, the use and limitations of condoms and alternative barrier contraceptives (e.g., female condoms) (Burchell et al., 2006; Dworkin et al., 2006; Neumann et al., 2002; Winer et al., 2006) along with the importance of discussing protective methods with potential partners was discussed during this segment (Hiltabiddle, 1996). Recommendations included annual Pap smears to detect abnormalities along with regular STI testing (Juszczyk, 2009) and the HPV-vaccine (CDC, 2009a). Lastly, a discussion of how these interventions apply to individuals who may already be infected with HPV was included. For example, while a participant may already be infected with one of the 4 types of HPV that the vaccine was designed to prevent, it is highly unlikely she was infected with all four (Garland et al., 2007). As a result, she would still benefit from the vaccine. It was also noted that the use of condoms while infected with HPV can reduce the likelihood of re-infection and is associated with a faster recovery from infection (Bleeker, et al., 2003; Hogewoning et al., 2003; Holmes et al., 2004).

For each of the risk-reduction behaviors, information aimed at increasing positive attitudes towards engaging in the risk-reduction behavior (e.g., reducing new sexual partners, using barrier contraceptives, discussing STIs with partners, receiving HPV vaccine, seeking information on HPV, receiving a Pap smear, getting tested for HIV and other STIs) was provided (Albarracin et al., 2001; Fisher, 1997; Hardeman et al., 2002; Jemmott et al., 2010) by providing more accurate information regarding the efficacy of risk-reduction methods and improve judgments towards the behaviors. Consistent with previous research recommendations (Jeste et al., 2008; Ingledue et al., 2004), information such as the definition and description of the disease along with prevalence and incidence

rates (Burchell et al., 1996) and methods of transmission (Burchell et al., 2006; CDC, 2007) was presented. The disease course including the asymptomatic nature of HPV, the use of Pap smears to detect HPV, the lack of treatment for HPV, and the tendency for HPV to regress naturally was discussed (CDC, 2007; Vega & Ghanem, 2007). Health conditions or consequences related to HPV were presented. For example, HPV types 6 and 11 cause the majority of genital warts cases (National Cancer Institute [NCI], 2008), while HPV types 16 and 18 are responsible for at least 70% of cervical cancer diagnoses, and approximately 30% of vaginal, anal, and neck cancers (Muñoz, Castellsagué, de González, & Gissman, 2006). Additionally, known infection risk factors such as multiple sexual partners (Burchell et al., 2006), sex (e.g., anal, oral, and vaginal) without protective barriers (e.g., condoms or other barrier contraceptives), and intercourse with partners who engage in sexual risk behaviors was discussed (Burchell et al., 2006). Participants were informed of the specific factors associated with the college environment that increase their risk such as the availability of multiple sex partners. Additionally, the incidence of HPV-related cancers (Parkin & Bray, 2006) and genital warts (NCI, 2008) was summarized. Also included were health risk factors associated with the development of HPV-related cancers, such as cigarette use (Burchell et al., 2006; Muñoz et al., 2006), a history of STIs, as well as a lack of Pap smears and STI testing (Burak & Meyer, 1997).

General information regarding current rates of condom use and other risk-reduction behaviors and expectations of behaviors, such as receiving a Pap smear, assisted in building beliefs regarding the social pressure to engage in the risk-reduction behaviors (Albarracin et al., 2001; Elder, Ayala, & Harris, 1999). Additionally, group

discussion and participants' self-report of the risk-reduction behaviors such as frequency of STI testing behaviors and expectations for condom use and provision were encouraged.

To increase participants' perceived behavioral control for engaging in the risk-reduction behaviors, the potential difficulties associated with completing the risk-reduction behaviors were noted (Albarracin et al., 2001), such as the cost of the HPV-vaccine (Conroy et al., 2009; Gerend & Magliore, 2008; Liddon et al., 2007; Zimet et al., 2010), or the discomfort associated with buying condoms or discussing use with a partner (Hiltabiddle, 1996; Jemmott et al., 2010). Additionally, barriers to the use of condoms and other barrier contraceptives were addressed (Hiltabiddle, 1996). These include beliefs regarding condoms as inconvenient, uncomfortable, difficult to use, and embarrassing to purchase or acquire (Bryan et al., 1996). Barriers to Pap smears, such as discomfort and cost were addressed (Burak & Meyer, 1997). Lastly, a discussion about barriers to STI testing was noted, including the psychological impact of an STI diagnosis (Juszczyk, 2009; McCaffery et al., 2003; Vega & Ghanem, 2007).

With each obstacle, ways of overcoming the challenge and successfully engaging in the risk-reduction behavior were discussed. Participants were encouraged to problem solve methods for overcoming the barriers to executing the risk-reduction behavior (Albarracin et al., 2001; Neumann et al., 2002). For example, a discussion about the specific medical procedures such as the vaccine, Pap smears and STI testing was covered (Burak & Meyer, 1997; Chapman et al., 2010) including locations to receive these procedures, anticipated cost, and methods for handling insurance. A discussion of ways to address the barriers to condom use and other barrier contraceptives occurred during

this segment (Lopez & McMahan, 2007), including locations to acquire and purchase condoms and other barrier devices (Bryan et al., 1996), videos demonstrating proper use of condoms (Hogewoning et al., 2003; Holmes et al., 2004) and other barrier contraceptives (Dworkin et al., 2006; Van Devanter et al., 2002). Further, methods of discussing condom use, sexual history, and STI testing with potential partners were reviewed (Burk et al., 1996; Dell et al., 2000; Gerend & Magliore, 2008; Hiltabiddle, 1996; Jemmott et al., 2010). For example, participants were encouraged to have these discussions in a 'safe' location (e.g., not alone with the potential partner in a dorm room) prior to being intimate instead of waiting for the 'heat of the moment' to have the discussions. For a general outline of the intervention see Appendix A and for a copy of the intervention slides see Appendix G.

Procedures

After reading a description of the study listed on the UNCC psychology recruitment site, eligible participants signed up for Part 1 of the study (time, date, location). Each intervention group was limited to a maximum of 8 participants (Rew et al., 2007). Participants were reminded that signing up for Part 1 required they also complete Part 2, a brief online survey.

Part 1.

Intervention. When the participants presented for their assigned time for Part 1, they were instructed to sit at a computer with a chair (the chair from every other computer was removed in order to provide more privacy). Prior to beginning, the facilitator ensured that participants were sitting at least one computer apart (approximately 4 feet apart). Once this had been confirmed, participants were provided

with the Informed Consent form (Appendix F). They were instructed to read the form carefully prior to signing. Additionally, the facilitator discussed key points of the form (e.g., voluntary participation, one-month follow-up required, contact information for the UNCC Counseling Center and IRB office).

Pre-test (T1). Once the informed consent forms were complete, the participants were given a card listing instructions for completion of the surveys. The card also reminded participants to remain seated after completing the surveys. Participants were then instructed to begin answering the computer-based surveys, using SurveyShare®. At that time (T1), participants completed the Demographics, HPV Knowledge Scale (HKS), Future Intentions Survey (FIS), Attitudes Toward Intentions (ATI), Subjective Norms (SN), Perceived Behavioral Control (PBC), and Sexual Health and History Survey (SHHS) measures (Appendix D).

Upon completion of the measures, participants received the intervention. In the intervention condition, participants were instructed to remain present for a brief, approximately 60-minute lecture and discussion (range = 55 minutes to 65 minutes). At that time, they were directed to a designated section of the room and asked to sit in one of the chairs provided. The facilitator began by reintroducing herself and reminding participants that participant information discussed in the group setting was confidential and not to be discussed elsewhere. Upon that time, the facilitator invited the participants to ask any questions they may have. After addressing the questions, Microsoft Power Point slides (see Appendix G) were projected onto a large screen so that all participants could see the information. The facilitator began by presenting slides that addressed the questions on the HKS. Participants were encouraged to discuss their knowledge of HPV

at that time and any concerns they had. The facilitator also presented slides providing the known risk factors of HPV. In addition, slides with information regarding methods of risk reduction along with barriers to utilizing those methods and societal expectations regarding use were presented and discussed while any questions or comments from participants were addressed. Lastly, slides and a discussion describing various ways to discuss STIs/HIV and initiate condom use with sexual partners ensued.

Post-test (T2). Once the intervention was complete, participants were instructed to complete the post-test measures (T2) which consisted of the HKS, FIS, ATI, SN, and PBC measures (Appendix E). These measures were completed through SurveyShare®. Following completion of the post-test measures, the participants were informed that the facilitator had collected their email addresses through SonaSystems® and would email them one week prior to follow-up as a reminder that they are to complete Part 2. Additionally, they were informed that on the day the participants were to complete the online survey, the facilitator would email an invitation code for participants to sign-up and complete part 2 of the study through SonaSystems®.

Participants were given a card thanking them for their participation, reminding them of the importance of completing the follow-up measures in 28 days, and included the principal investigator's email and the faculty supervisor's contact information (e-mail and office phone).

Control. When the participants presented for their assigned time for Part 1, they were instructed to sit at a computer with a chair (the chair from every other computer was removed in order to provide more privacy). Prior to beginning, the facilitator ensured that participants were sitting at least one computer apart (approximately 4 feet apart).

Once that had been confirmed, participants were provided with the Informed Consent form (Appendix F). They were instructed to read the form carefully prior to signing. Additionally, the facilitator discussed key points of the form (e.g., voluntary participation, one-month follow-up required, contact information for the UNCC Counseling Center and IRB office).

Pre-test (T1). Once the informed consent forms were complete, the participants were given a card listing instructions for completion of the surveys. The card also reminded participants to remain seated after completing the surveys. Participants were then instructed to begin answering the computer-based surveys, using SurveyShare®. At that time (T1), participants completed the Demographics, HKS, FIS, ATI, SN, PBC, and SHHS measures (Appendix D).

Upon completion of the measures, participants began the control intervention. In the control condition, participants were instructed to remain at their computer. Participants were then instructed to type in the web address (http://www.youtube.com/watch?v=9oWgHj7QPHw) that directly linked them to the 45-minute online video detailing study skills. The participants were instructed to watch the entire video.

Post-test (T2). Once the intervention was complete, participants were instructed to complete the post-test measures (T2) which consisted of the HKS, FIS, ATI, SN, and PBC measures (Appendix E). These measures were completed through SurveyShare®. Following completion of the post-test measures, the participants were informed that the facilitator had collected their email addresses through SonaSystems® and would email them one week prior to follow-up as a reminder that they are to complete Part 2.

Additionally, they were informed that on the day the participants were to complete the online survey, the facilitator would email an invitation code for participants to sign-up and complete part 2 of the study through SonaSystems®.

Participants were given a card thanking them for their participation, reminding them of the importance of completing the follow-up measures in 28 days, and included the principal investigator's email and the faculty supervisor's contact information (e-mail and office phone).

Follow-Up (T3). Approximately three weeks after completion of the post-test, participants were contacted by email and reminded of the date of their follow-up (Appendix H). Twenty-eight days after participating in Part 1, the principal investigator emailed the invitation code to participants in order for them to complete Part 2 of the study (Appendix I). In the email, participants were instructed to log onto SonaSystems® and go to the study labeled "Behaviors - Part Two" where they entered the invitation code to complete the surveys. At follow-up, all participants completed Demographics, HKS, FIS, ATI, SN, PBC, and SHHS measures through SurveyShare® (Appendix D). Upon completion of the survey, the principal investigator emailed participants with the contact information for the UNCC Counseling Center, the UNCC Student Health Center, and the UNCC IRB office. Additionally, the contact information for the principal investigator (email) and the faculty supervisor (office phone and email) was provided (Appendix J). Once 12 participants completed the follow-up measures, those 12 participants' names were entered into a drawing to win a $50 gift card to Target. The winner of the drawing was emailed and provided with instructions for how to receive the gift card.

CHAPTER 3: RESULTS

Non-Behavioral Measure Analysis

Descriptive statistics for all scale score results (i.e., HKS, FIS, ATI, SN, and PBC) across conditions are presented in Table 1. For each of the non-behavioral measures, participants scored in the moderate to high range at T1. Independent-samples *t*-tests revealed no significant differences between conditions across T1 scores for all non-behavioral measures.

T1 to T2: Hypothesis 1

To test Hypothesis 1, a hierarchical regression analysis was used for measures with continuous response scales [e.g., knowledge (HKS), intentions (FIS), attitudes (ATI), social norms (SN), and perceived behavioral control (PBC)] with participants' scores at T2 as the criterion variable. Results are shown in Table 2. Baseline scores (i.e., scores at T1) were entered first, followed by the control variables of relationship status (0=single, 1=in a relationship) and sexual orientation (0=heterosexual, 1=other). The predictor variable of group condition (0=control, 1=intervention) was added to create the third model to determine the effect of group condition after controlling for all other variables. The group condition had a large effect ($\Delta R^2 = .44$) on changes in HKS from T1 to T2. After controlling for sexual orientation and relationship status, the intervention group's average change in HKS scores from T1 to T2 was .32 points higher (on a scale of 0 to 2) than the change demonstrated in the control group. Similarly, group condition had

a large effect (ΔR^2 = .19) on changes in FIS from T1 to T2, such that the intervention group's average change was .34 points higher (on a scale of 0-2) than the control group's change from T1 to T2 after controlling for both sexual orientation and relationship status. In other words, participants in the intervention condition demonstrated a significantly higher increase in HKS and FIS scores immediately after the intervention as compared to the control condition. The intervention had statistically significant but small effects on the changes in participants' attitudes towards risk-reduction behaviors (ΔR^2 = .05) and perceived social norms (ΔR^2 = .03), such that participant in the intervention condition had more positive attitudes towards risk-reduction behaviors and a greater perceived social pressure to engage in risk-reduction behaviors. With respect to perceived behavioral control, the intervention showed a small effect (ΔR^2 = .02) though it was not statistically significant. These findings suggest that the intervention effectively increased knowledge and behavioral intentions, but had less agency when it came to addressing risk-reduction attitudes, social norms, and behavioral control. However, it should be noted that the smaller effect sizes may be due to restricted range; participants' pre-existing attitudes and perceptions of behavioral control at T1 were high, creating a ceiling effect.

T2 to T3: Hypothesis 2

To test Hypothesis 2, a hierarchical regression analysis was used for measures with continuous response scales (e.g., HKS, FIS, ATI, SN, and PBC) with participants' scores at T3 as the criterion variable. Results are shown in Table 3. Post-test (i.e., scores at T2) were entered first, followed by the control variables of relationship status (0=single, 1=in a relationship) and sexual orientation (0=heterosexual, 1=other). The predictor variable of group condition (0=control, 1=intervention) was added to create the

third model to determine the effect of group condition after controlling for all other variables. As anticipated, the effect of group condition on participants' scores from T2 to T3 was minimal and not statistically significant; suggesting that maintenance of scores was not associated with group condition.

T1 to T3: Hypothesis 3

To test Hypothesis 3, a hierarchical regression analysis was used for items with continuous response scales (e.g., HKS, FIS, ATI, SN, and PBC) with participants' scores at T3 as the criterion variable. Results are shown in Table 4. Baseline scores (i.e., scores at T1) were entered first, followed by the control variables of relationship status (0=single, 1=in a relationship) and sexual orientation (0=heterosexual, 1=other). The predictor variable of group condition (0=control, 1=intervention) was added to create the third model to determine the effect of group condition after controlling for all other variables. The group condition had a large effect on changes in HKS from T1 to T3 (ΔR^2 = .18). After controlling for sexual orientation and relationship status, the intervention group's change in HKS scores from T1 to T3 was .17 points higher than the change demonstrated in the control group. Similarly, group condition had a medium effect on changes in FIS from T1 to T3 (ΔR^2 = .06), such that the intervention group's change was .20 points higher than the control group's change from T1 to T3 after controlling for both sexual orientation and relationship status. In other words, participants in the intervention condition demonstrated a higher increase in HKS and FIS scores after the intervention and this increase was maintained one-month post-intervention as compared to the control condition, though the size of the effect at T3 is smaller than the initial change observed at T2 (see above). The intervention had a small effect on the changes in participants'

perceived social norms ($\Delta R^2 = .02$) though it was not statistically significant. Contrary to the hypothesized outcome, the effect of the intervention on the changes in participants' attitudes towards risk-reduction behaviors and perceived behavioral control of the risk-reduction behaviors was not statistically significant. Similar to the findings from T1 to T2, the intervention was not sufficient in initiating long-term changes in risk-reduction attitudes, social norms, and behavioral control.

SHHS Behavior Analysis

Descriptive statistics for the SHHS items are shown in Table 5. At T1, participants reported an average of 9.8 lifetime sexual partners with an obtained range from 1-41 and 2.01 (ranging from 1-4) sexual partners in the past month, with most of them being partners of the opposite-sex. Very few participants had engaged in same-sex relationships (n=14). The majority of sexual partners reported were vaginal sex partners and oral sex partners. Very few participants reported anal sex partners (n=22). As a result of the low levels of engagement, participants' same-sex and anal sex behaviors were not assessed further. At T1, participants reported rarely talking with partners about STIs or using barrier contraceptives with sexual partners. At T1, few participants had received the HPV vaccine (11%), had been tested for HIV (39.5%), and smoked cigarettes (17.1%). A majority of the participants had sought information on HPV (57.3%), received a Pap smear (64.6%), and had been tested for STIs (57.3%). An independent-samples *t*-test revealed no significant differences between conditions across T1 scores for SHHS items of interest.

Continuous Outcomes: Hypothesis 4

To test Hypothesis 4, a hierarchical regression analysis was used for items with continuous response scales (e.g., number of lifetime sexual partners; number of sexual partners in the previous month; frequency of STI discussions with partners; frequency of barrier contraceptive use with partners) consistent with the analyses reported above. See Tables 6-9 for results. The intervention had a small effect on the change in participants' number of sexual partners in the previous month ($\Delta R^2 = .02$) though it was not statistically significant. Small but not significant effects were also noted on the changes in participants' frequency of discussions about STIs with vaginal ($\Delta R^2 = .03$) and oral sex partners ($\Delta R^2 = .02$). Similarly, although a small effect of the intervention was noted on changes in participants' frequency of barrier contraceptive use with oral sex partners ($\Delta R^2 = .02$), the change was not statistically significant. Overall, group condition did not significantly predict a change in risk-reduction behaviors from T1 to T3, suggesting that the intervention failed to have a significant effect on participants' behaviors.

Dichotomous Outcomes: Hypothesis 4

For SHHS items with dichotomous outcomes (e.g., "Have you received one or more HPV vaccines?," "Have you sought out any information on HPV?," "Have you ever had a Pap smear?," "Have you ever been tested for HIV?," "Have you ever been tested for an STI?," "Do you currently smoke cigarettes?"), a Chi-square test was used to assess differences between conditions from Time 1 to Time 3. See Table 10 for complete results. Results from the analysis revealed significant differences between the groups for HPV information seeking behavior ("Have you sought out any information on HPV?") and HIV testing behavior ("Have you ever been tested for HIV?"). The results indicate that participants who received the intervention were more likely to seek information

about HPV than those who did not. Similarly, participants in the intervention condition were more likely to get tested for HIV following the intervention than the control group. The intervention was not related to change in other dichotomous HPV risk-reduction behavioral variables (e.g., HPV vaccine, Pap smear, STI testing, abstaining from cigarette use). However, it should be noted that the findings may be due to a pre-existing high rate; at T1, many participants had previously received a Pap smear and STI testing. Similarly, very few participants smoked cigarettes. As such, the lack of significance may be a byproduct of the ceiling effect.

Overall, these findings do provide some empirical support for a brief one-time educational intervention in eliciting positive change in the factors associated with HPV risk reduction. Consistent with the hypotheses, the intervention was successful at increasing knowledge, behavioral intentions, HPV information-seeking and HIV testing and these changes were maintained over a one-month interval. Modest increases in attitudes toward risk-reduction behaviors and in related self-efficacy were obtained immediately after the intervention, but not at follow-up. Contrary to the hypothesized outcome, the intervention was also not successful at creating increases in social norms and many of the risk reduction behaviors (e.g., reducing new sexual partners, using barrier contraceptives, discussing STIs with partners, receiving HPV vaccine, receiving a Pap smear, getting tested for STIs).

CHAPTER 4: DISCUSSION

The purpose of this study was to advance the field of sexual risk reduction with regards to HPV. The study was an exploratory study developed to determine the effectiveness of a group intervention on increasing sexual risk-reduction behaviors specific to HPV among sexually active, college-aged women.

Non-Behavioral Indicators

T1 to T2: Hypothesis 1. Scores across all non-behavioral measures were assessed from Time 1 to Time 2 to determine the immediate impact of the intervention. Consistent with Lambert's (2001) findings, the intervention successfully increased participants' HPV-related knowledge compared to those in the control group, indicating that the intervention material was effective in providing factual material regarding HPV. Similarly, participants in the intervention group had greater positive change in their intentions to engage in the targeted risk-reduction behaviors (e.g., intentions to use condoms, intentions to receive STI testing) compared to the control group. The intervention increased participants' intentions to engage in the targeted behaviors, such that participants were more likely to report that they intended to engage in the targeted behaviors after completing the intervention as compared to their responses prior to the intervention. Further, these changes were higher in the intervention group, compared to the control group, suggesting that the results can be attributed to the intervention.

Smaller changes were noted in attitudes towards engaging in the risk-reduction behaviors in the intervention group. The change was minimal with respect to the intervention group's perceived behavioral control for the risk-reduction behaviors (e.g., perceived control for reducing the number of sexual partners or using condoms). Of note, in both groups, participants' pre-existing attitudes towards the risk-reduction behaviors along with the perceived behavioral control were already quite high. Although disappointing for this study because the ceiling effect limited the ability to draw conclusions regarding the efficacy in these two areas, these findings are positive. Higher scores prior to engaging in the intervention suggest that attitudes and perceived control of the sample were in the desirable range. Approximately half of the participants indicated that they had not received information about HPV prior to the study. The other half indicated that they had learned about HPV either through the physician or the Internet.

Surprisingly, perceived social norms were considerably low for all participants prior to completing the intervention (2.21 out of 4 for the total sample), suggesting that participants perceived minimal social pressure to engage in the risk-reduction behaviors. Although changes in perceived social norms were noted among the intervention group, these changes were small, suggesting that the intervention did not influence perceived peer norms related to risk reduction.

T2 to T3: Hypothesis 2. Scores across all non-behavioral measures were examined from Time 2 to Time 3 to determine if there was a difference between groups in terms of maintenance of information. As hypothesized, neither group demonstrated significant change in their scores from T2 to T3. Given that the intervention group showed a significant increase from T1 to T2, and from T1 to T3, this suggests that

participants in the intervention condition maintained the information provided in the intervention over a one-month period even though there may have been some regression to the mean at T3.

T1 to T3: Hypothesis 3. To determine the longer-term effects of the intervention, scores across all non-behavioral measures were compared from Time 1 to Time 3. As hypothesized, participants in the intervention condition continued to demonstrate significantly higher knowledge scores one-month post-intervention compared to the control group. Similarly, participants' intentions to engage in the targeted behaviors were higher after the intervention as compared to the control group, and this change was maintained one-month post-intervention. However, while the intervention's impact was notable, the changes were less substantial than they were at Time 2, suggesting that the impact of the intervention may have degraded over time.

Consistent with the findings from T1 to T2, changes in perceived social norms, attitudes towards engaging in the targeted behaviors, and perceived behavioral control for the intervention were not significant. Given the intervention's failure to initiate significant change from T1 to T2, it is not surprising that the change in these factors was not apparent one-month after the intervention.

Behavioral Indicators: T1 to T3

Hypothesis 4. Changes in risk reduction and prevention behaviors from T1 to T3 were compared to determine the impact of the intervention on behavioral change. The intervention was unsuccessful in initiating significant change for most of the risk-reduction behaviors. The only significant changes in the behaviors were seen in the HPV information- seeking and, interestingly, in HIV testing behavior. While these behaviors

may not be direct methods of HPV prevention, research suggests that these are important steps to risk reduction (Jemmott & Jemmott, 2000; Lambert, 2001; McCree et al., 2007). Small, but not significant effects were noted in several risk-reduction behaviors. For example, participants in the intervention condition had fewer sex partners as compared to the control condition when comparing the month prior to the intervention to the month following the intervention. Similarly, participants were more likely to talk with vaginal and oral sex partners about STIs following the intervention. Participants were also more likely to use barrier contraceptives after the intervention, regardless of their relationship status and use of hormonal contraceptives. These conclusions must be interpreted with caution given the small effect size. Unfortunately, the small sample size prohibited a meaningful analysis. A number of participants had either not engaged in a sexual risk behavior to notice a reduction (e.g., anal sex) or had already engaged in the risk-reduction behavior (e.g., received Pap smear). Perhaps, with a larger sample size and, possibly, a greater time period between the intervention and follow-up, a greater effect of the intervention would be detected.

However, on a positive note, these findings do provide some empirical support for a brief one-time educational intervention in reducing the risk of an HPV infection. Measurable improvements in HPV knowledge and in intentions to engage in risk-reduction behaviors were seen and these changes were maintained at one-month follow-up. Modest increases in attitudes toward risk-reduction behaviors, subjective norms, and related perceived behavioral control were obtained immediately after the intervention, but not at follow-up. Pre-existing levels of attitudes and perceived behavioral control with respect to the risk-reduction behaviors were high, limiting the ability to detect an effect of

the intervention. Interestingly, pre-existing perceived peer norms related to risk reduction were low and remained relatively low for both groups; this suggests that participants perceived little peer pressure to engage in behaviors associated with reduced-risk for HPV infection.

Implications

The intervention was a single-session intervention lasting for one hour. Given the complexity of the thoughts and behaviors associated with sexual risk reduction, a more intensive program consisting of a longer session or multiple sessions may be advisable. By doing so, a greater level of measurable change that is maintained for longer periods of time may be possible. Further, while the intervention incorporated skills-based components, there was little opportunity for participants to practice those skills in the intervention. Future interventions should place greater emphasis on the practice of the skills (Brawner et al., 2012) such as role-playing, sex refusal, or condom purchase and negotiation (Dworkin, Exner, Melendez, Hoffman, & Ernhhardt, 2006; Wingood & DiClemente, 1996). Additionally, finding ways to increase the ability to address factors such as perceived social norms is an important and complicated area (Brawner et al., 2012). Perhaps, having participants engage in their own data collection regarding options for reducing risk with their peers between sessions may be beneficial to assist in building more realistic and positive perceptions of the social pressure to engage in risk-reduction behaviors (Kirby et al., 2004). Alternative suggestions included having naturally formed peer groups complete the intervention together to increase group norms (Stanton et al., 1996) or have peer facilitators lead the intervention (Coyle et al., 2001).

Similarly, by incorporating a more CBT-based approach to the interventions in which participants are encouraged to practice the desired behaviors and record their efforts between sessions may beneficial (Farrell et al., 2008). This would allow participants to discuss the challenges they met when attempting to engage in the desired behaviors. Intervention facilitators could then encourage the group to problem-solve the ways to address the challenges as a group. By doing so, participants' attitudes, intentions, and perceived control for the targeted behaviors may be enhanced above and beyond what is possible in a single session intervention.

Additionally, given the brief nature of the intervention, participants may have felt less comfortable clarifying misconceptions in the group format. Therefore, interventions in which the group meets for multiple sessions may improve that comfort by increasing group members' familiarity and engagement (MacKenzie & Livesly, 1983). As a result, participants' likelihood of asking for more specific clarification based on their needs may increase.

Another suggested method for increasing effectiveness and participant comfort that might also be more cost and time efficient is an interactive, Internet-delivered intervention. The Internet is readily being used for information gathering among older adolescents. It is often the leading source of information due to ease of access, anonymity and affordability (Goldman & Bradley, 2001; Lu, 2009; Williams & Bonner, 2006). In fact, many individuals have indicated a preference for the Internet compared to health care providers as a source of health information, particularly information about sexual health and practices (Lu, 2009). Females, in particular, have a greater tendency to seek out health information online compared to men (Gilbert, Temby, & Rogers, 2005).

Similar to the procedures utilized in this study, the Internet is being used to collect data regarding sexual health behavior (Herbenick et al., 2010a; Reece et al., 2010). A growing area of interest in the field of STI risk reduction is the use of Internet delivered interventions. Research has shown that the Internet is considered to be a useful and efficient method of intervention and information delivery by both participants and providers (Goldman & Bradley, 2001; Lu, 2009; Pequegnat et al., 2006; Rhodes et al., 2003). Further, because online interventions are more cost-efficient (Williams& Bonner, 2006), yield more reliable data (Chiasson et al., 2006; Kissinger et al., 1999; Pequegnat et al., 2007; Zenilman, 2005), and are accessible by a wide audience (Chiasson et al., 2006; Goldman & Bradley, 2001; Pequegnat et al., 2007; Rhodes et al., 2010), they hold great promise in the field of health promotion.

The current findings do suggest that a single-session educational intervention can produce measurable improvements in HPV knowledge and in intentions to engage in sexual risk reduction, as well as increased HPV information-seeking and HIV testing, and that these changes can be maintained over a one-month interval. Briefer increases in subjective norms, risk-reduction attitudes, and perceived behavioral control were also obtained.

Therefore, transferring the intervention used in this study into an Internet-delivered group intervention, in which individuals can participate from the privacy of their home is a possible next step. By developing the intervention into an Internet-delivered product, a number of the present study's limitations might be addressed. Ease of access should result in a greater participant pool along with the ability to increase the intervention length without additional constraints. Most importantly, it may also permit

greater participant comfort and engagement, thereby increasing the impact on risk-reduction behaviors. Similarly, there are greater opportunities for perceived social influence such as the use of peer facilitators or online bulletin boards in which peers are encouraged to engage in discussions regarding risk-reduction behaviors.

Of course, this modality presents challenges of its own, including higher expected attrition rates (Bull, McFarlane, & King, 200), limited points of contact between the researchers and participants (Bull, Lloyd, Rietmeijer, & McFarlane, 2004) along with confounding variables such as the assessment and intervention environment (e.g., lab versus home), the content and level of interaction with the intervention, and sampling bias. As with every area of research, careful consideration on behalf of the researchers is a must in order to reduce the impact of those challenges.

Limitations

Given the exploratory nature of the study, there are several limitations in the present study. First and foremost is the sample size. Although the sample size for Part 1 was adequate, 13.3% of all participants (18.9% from the control group, 6.4% from the intervention group) did not return for the one month follow-up. As noted in previous research of comparable studies (Kamb et al., 1998; Petersen et al., 2007; Robin et al., 2004), the overall rate of attrition (13.3%) and the control group rate of attrition (18.9%) were expected. What was not anticipated was the low rate among the intervention group. However, the interactional nature of the intervention, along with facilitator differences (e.g., principle investigator facilitated the intervention while either the principal investigator or the research assistant facilitated the control) compared to the control could explain the differential attrition. What was not anticipated was the additional loss of

participants based on exclusion-criteria (e.g., sexual history and/or age), suggesting that the screening measures used in the online sampling database were insufficient such that certain participants who were ineligible based on exclusion criteria were able to sign up for and complete the study.

Unfortunately, the limited number of participants prevented certain items from being analyzed (e.g., anal sex risk-reduction behaviors; same-sex risk-reduction behaviors) and, perhaps, muddled the available results. Thus, the strength of the conclusions is minimal. In order to ensure proper analysis of all variables of interest, oversampling in future studies is recommended. Lastly, the intervention focused on HPV risk reduction among women. Given the growing rate of HPV and HPV-associated cancers among men (CDC, 2012b) and similar reported barriers to vaccine use for men (Paul et al., 2013), future research examining the effectiveness of an HPV intervention developed for men is warranted.

Conclusion

The study was designed to assist in the field of risk reduction in order to diminish the risk of HPV infection for college-aged females (Bennett & Hodgson, 1992). Consistent with other risk-reduction interventions, the aim was to positively impact factors related to risk reduction (e.g., knowledge, intentions, attitudes, perceived social norms, perceived behavioral control) while simultaneously promoting risk-reduction behaviors. Despite a number of limitations, the study demonstrated that a single-session educational intervention guided by the principles of TPB (Ajzen, 1991) and previous sexual risk-reduction research can be at least partially efficacious in reducing the risk of HPV infection among college-aged females. However, partial efficacy is not true success

in the field of risk reduction. Given the ubiquitous nature of HPV, the low rates of vaccination, and the limited ability of current vaccines to prevent all types of high-risk HPV, further research to determine more effective methods of HPV risk reduction is warranted. Further research is indicated to not only reduce the risk of an HPV infection but also to aid in early detection and treatment of HPV infection to reduce the risk of the HPV-related cancers among women.

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Table 1. T1, T2, and T3 Non-Behavioral Measures Descriptives

	Intervention n=40						Control n=42						Total N=82					
	T1		T2		T3		T1		T2		T3		T1		T2		T3	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
HKS*	1.54	.22	1.87	.14	1.77	.17	1.55	.23	1.55	.23	1.57	.20	1.54	.22	1.71	.25	1.65	.21
FIS*	1.33	.38	1.67	.32	1.44	.40	1.32	.36	1.33	.40	1.24	.40	1.33	.37	1.50	.40	1.34	.41
ATI*	1.78	.22	1.90	.13	1.86	.18	1.83	.17	1.86	.13	1.87	.15	1.81	.20	1.88	.13	1.87	.16
SN**	2.30	.63	2.58	.76	2.38	.72	2.12	.70	2.13	.68	2.04	.69	2.21	.67	2.35	.75	2.21	.72
PBC**	3.29	.54	3.50	.47	3.35	.56	3.41	.47	3.44	.52	3.36	.53	3.35	.50	3.47	.50	3.36	.54

Note. HKS = HPV Knowledge Scale. FIS = Future Intentions Survey. ATI = Attitudes Towards Intentions. SN = Subjective Norms. PBC = Perceived Behavioral Control.*=highest possible score of 2. **=highest possible score of 4.

Table 2. Analysis of changes in non-behavioral measures from T1 to T2 as a function of background variables and group condition.

		HKST2			FIST2			ATIT2			SNT2			PBCT2		
		b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2
Model 1	(Intercept)	.88	.17	.24**	.46	.12	.52**	1.15	.11	.38**	.28	.16	.70**	1.19	.27	.48**
	Response at T1	.53**	.11		.78**	.09		.40**	.06		.94**	.07		.68**	.08	
Model 2	(Intercept)	.90	.17	.02	.51	.14	.01	1.10	.11	.05*	.48	.18	.02	1.19	.28	.00
	Response at T1	.52**	.11		.76**	.09		.44**	.06		.90**	.07		.68**	.08	
	Relationship Status	.03	.05		-.05	.07		-.02	.02		-.22*	.10		.01	.08	
	Sexual Orientation	-.10	.09		.06	.11		.09*	.04		-.03	.16		-.00	.15	
Model 3	(Intercept)	.69	.11	.44**	.32	.11	.19**	1.03	.11	.05*	.40	.17	.03**	1.06	.28	.02
	Response at T1	.54**	.07		.77**	.07		.46**	.06		.88**	.07		.69**	.08	
	Relationship Status	.05	.03		-.02	.05		-.02	.02		-.20*	.09		.02	.08	
	Sexual Orientation	-.08	.06		.09	.09		.10*	.04		-.00	.15		.00	.15	
	Group Condition	.32**	.03		.34**	.05		.06*	.02		.28**	.09		.15	.08	

Note. N = 82. *p < .05. ** p < .01. b = unstandardized beta weight. HKS = HPV Knowledge Scale. FIS = Future Intentions Survey. ATI = Attitudes Towards Intentions. SN = Subjective Norms. PBC = Perceived Behavioral Control. Relationship status = Single (0) vs. Not Single (1). Sexual Orientation = Heterosexual (0) vs. Not Heterosexual (1).

Table 3. Analysis of changes in non-behavioral measures from T2 to T3 as a function of background variables and group condition.

		HKST3			FIST3			ATIT3			SNT3			PBCT3		
		b	S.E.	Δ R^2	b	S.E.	Δ R^2	b	S.E.	Δ R^2	b	S.E.	Δ R^2	b	S.E.	Δ R^2
Model 1	(Intercept)	.68	.12	.46**	.20	.12	.55**	.31	.21	.42**	.74	.21	.42**	1.10	.34	.36**
	Response at T2	.57**	.07		.76**	.08		.83**	.11		.63**	.08		.65**	.10	
Model 2	(Intercept)	.68	.12	.00	.39	.13	.05*	.36	.21	.02	.76	.25	.01	1.13	.35	.01
	Response at T2	.57**	.07		.72**	.08		.82**	.11		.63**	.09		.65**	.10	
	Relationship Status	.01	.04		-.18**	.06		-.05	.03		-.02	.13		-.03	.10	
	Sexual Orientation	.00	.06		-.13	.11		-.02	.05		-.26	.22		-.14	.18	
Model 3	(Intercept)	.65	.15	.00	.36	.14	.00	.34	.21	.01	.77	.25	.00	1.15	.35	.00
	Response at T2	.59**	.09		.75**	.09		.84**	.11		.62**	.09		.65**	.10	
	Relationship Status	.01	.04		-.17**	.06		-.04	.03		-.03	.14		-.02	.10	
	Sexual Orientation	.00	.06		-.14	.11		-.02	.05		-.26	.23		-.14	.18	
	Group Condition	-.02	.05		-.06	.07		-.04	.03		.05	.13		-.06	.10	

Note. N = 82. *p < .05. ** p < .01. b = unstandardized beta weight. HKS = HPV Knowledge Scale. FIS = Future Intentions Survey. ATI = Attitudes Towards Intentions. SN = Subjective Norms. PBC = Perceived Behavioral Control. Relationship status = Single (0) vs. Not Single (1). Sexual Orientation = Heterosexual (0) vs. Not Heterosexual (1).

Table 4. Analysis of changes in non-behavioral measures from T1 to T3 as a function of background variables and group condition

		HKST3			FIST3			ATIT3			SNT3			PBCT3		
		b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2
Model 1	(Intercept)	1.07	.15	.17**	.29	.12	.51	.82	.12	.47**	.69	.22	.40**	1.40	.34	.30**
	Response at T1	.38**	.09		.80**	.09		.58**	.07		.69**	.09		.59**	.10	
Model 2	(Intercept)	1.05	.15	.01	.48	.13	.06**	.84	.12	.04*	.79	.25	.03	1.40	.35	.01
	Response at T1	.37**	.09		.75**	.09		.59**	.07		.69**	.10		.59**	.10	
	Relationship Status	.05	.04		-.19**	.06		-.06*	.03		-.14	.13		-.00	.10	
	Sexual Orientation	-.01	.08		-.15	.11		.04	.05		-.36	.23		-.22	.18	
Model 3	(Intercept)	.94	.14	.18**	.40	.13	.06**	.82	.13	.00	.75	.25	.02	1.36	.36	.00
	Response at T1	.39**	.09		.74**	.08		.59**	.07		.67**	.10		.60**	.10	
	Relationship Status	.04	.04		-.21**	.06		-.06*	.03		-.15	.13		-.01	.11	
	Sexual Orientation	-.00	.07		-.14	.10		.04	.05		-.34	.22		-.22	.18	
	Group Condition	.17**	.04		.20**	.06		.02	.03		.22	.12		.05	.10	

Note. N = 82. *p < .05. ** p < .01. b = unstandardized beta weight. HKS = HPV Knowledge Scale. FIS = Future Intentions Survey. ATI = Attitudes Towards Intentions. SN = Subjective Norms. PBC = Perceived Behavioral Control. Relationship status = Single (0) vs. Not Single (1). Sexual Orientation = Heterosexual (0) vs. Not Heterosexual (1).

Table 5. T1 and T3 SHHS Descriptives

	Intervention				Control				Total			
	T1		T3		T1		T3		T1		T3	
	M	SD(n)	M	SD(n)	M	SD(n)	M	SD(n)	M	SD(n)	M	SD(n)
Lifetime SP	10.55	9.78(40)	11.15	12.42(40)	9.24	7.70(42)	10.14	10.22(42)	9.88	8.75(82)	10.63	11.29(82)
Lifetime OSP	10.1	9.53(40)	10.78	12.43(40)	8.95	7.54(42)	9.86	10.14(42)	9.51	8.54(82)	10.31	11.26(82)
Lifetime SSP	2.00	1.32(9)	1.88	1.26(8)	2.40	1.14(5)	3.00	1.41(4)	2.14	1.23(14)	2.25	1.29(12)
Lifetime VSP	6.49	6.30(37)	5.97	6.92(39)	4.82	3.97(39)	5.67	5.38(39)	5.63	5.27(76)	5.82	6.16(78)
Lifetime ASP	2.00	1.29(7)	1.33	.82(6)	1.87	1.19(15)	1.93	1.27(14)	1.91	1.19(22)	1.75	1.16(20)
Lifetime OrSP	4.54	4.01(37)	5.39	6.84(38)	4.30	4.71(40)	4.34	4.84(41)	4.42	4.36(77)	4.85	5.88(79)
Last Month SP	1.95	1.18(40)	1.78	.54(36)	2.07	1.05(42)	2.05	1.13(37)	2.01	1.11(82)	1.92	.89(73)
Last MonthOSP	1.92	1.18(39)	182	.53(33)	2.00	.94(42)	2.00	1.03(37)	1.96	1.05(81)	1.91	.83(70)
Last Month SSP	1.50	.71(2)	1.33	.58(3)	1.50	.71(2)	2.00	(1)	1.50	.58(4)	1.50	.58 (4)
Last MonthVSP	1.14	.68(36)	1.09	.17(34)	1.24	.60(37)	1.18	.72(34)	1.19	.64(73)	1.10	.52(68)
Last Month ASP	1.00	(1)	1.00	(1)	1.00	.00(2)	1.25	.50(4)	1.00	.00(3)	1.20	.45(5)
Last MonthOrSP	1.16	.45(31)	1.00	.00(28)	1.08	.28(36)	1.03	.18(30)	1.12	.37(67)	1.02	.13(58)

Table 5. T1 and T3 SHHS Descriptives (cont.)

STI Talk*	4.33	.98(40)	4.03	1.26(36)	4.22	.97(42)	4.16	.91(37	4.27	.97(82)	4.09	1.09(73)
STI Talk OSP*	4.33	.99(39)	4.02	1.27(33)	4.21	.96(42)	4.14	.93(37)	4.27	.97(81)	4.08	1.10(70)
STI Talk VSP*	4.30	1.00(37)	3.94	1.30(34)	4.12	.98(37)	4.03	1.06(34)	4.21	.99(74)	3.99	1.18(68)
STI Talk OrSP*	4.42	.96(31)	4.18	1.25(28)	4.24	1.11(36)	4.23	.97(30)	4.32	1.04(67)	4.21	1.10(58)
Barrier Use*	3.76	1.20(40)	3.57	1.36(36)	3.97	1.19(42)	4.08	1.24(37)	3.87	1.19(82)	3.83	1.32(73)
Barrier OSP*	3.73	1.20(39)	3.61	1.33(33)	3.94	1.19(42)	4.05	1.27(37)	3.84	1.19(81)	3.84	.31(70)
Barrier VSP*	2.84	1.68(37)	2.66	1.77(34)	3.24	1.71(37)	3.68	1.55(34)	3.04	1.69(74)	3.16	1.73(68)
Barrier OrSP*	4.97	.18(31)	4.85	.53(27)	4.92	.37(36)	4.80	.76(30)	4.94	.30(67)	4.82	.66(57)

Note. SP = Sex partner. OSP = Opposite-sex partner. SSP = Same-sex partner. VSP = Vaginal sex partner. ASP = Anal sex partner. OrSP = Oral sex partner. *Likert scale (1=always, 2=often, 3=sometimes, 4=rarely, and 5=never).

Table 6. Analysis of changes in lifetime sexual partners from T1 to T3 as a function of background variables and group condition

		LSPT3[a]			LOSPT3[b]			LVSPT3[c]			LOrSPT3[d]		
		b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2
Model 1	(Intercept)	-.34	.96	.74	-.52	.95	.75**	.14	.45	.79**	.11	.59	.64**
	T1	1.11**	.07		1.14**	.07		.96**	.06		1.09**	.10	
Model 2	(Intercept)	.69	1.31	.03*	.60	1.30	.03*	.78	.61	.01	.61	.85	.02
	T1	1.13**	.07		1.14**	.07		.96**	.06		1.10**	.10	
	Relationship Status	-1.16	1.28		-1.06	1.27		-.77	.62		-.57	.86	
	Sexual Orientation	-6.24**	2.23		-6.30**	2.19		-2.10	1.11		-2.75	1.55	
Model 3	(Intercept)	.91	1.41	.00	.79	1.40	.00	.95	.66	.00	.33	.91	.00
	T1	1.13**	.07		1.15**	.07		.97**	.06		1.09**	.10	
	Relationship Status	-1.12	1.29		-1.03	1.28		-.76	.62		-.63	.87	
	Sexual Orientation	-6.29**	2.24		-6.33**	2.20		-2.11	1.11		-2.65	1.56	
	Group Condition	-.55	1.24		-.47	1.23		-.43	.61		.70	.83	

Note. N^a =82, N^b=82, N^c=78, N^d=79. *p < .05. ** p < .01. b = unstandardized beta weight. . LSP = Lifetime sex partners. LOSP = Lifetime opposite-sex partners. LVSP = Lifetime vaginal sex partners. LOrSP = Lifetime oral sex partners. Relationship status = Single (0) vs. Not Single (1). Sexual Orientation = Heterosexual (0) vs. Not Heterosexual (1).

Table 7. Analysis of changes in sexual partners in the past month from T1 to T3 as a function of background variables and group condition

		MSPT3 [a]			MOSPT3 [b]			MVSPT3 [c]			MOrSPT3 [d]		
		b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2
Model 1	(Intercept)	1.22	.20	.18**	1.30	.20	.16**	.57	.12	.32**	1.04	.07	.00
	T1	.34**	.09		.31**	.09		.46**	.09		-.02	.07	
Model 2	(Intercept)	1.34	.25	.07	1.38	.23	.15**	.75	.16	.09*	1.10	.06	.35**
	T1	.28**	.09		.23**	.08		.35**	.09		-.07	.06	
	Relationship Status	-.11	.20		-.02	.18		-.15	.12		-.02	.03	
	Sexual Orientation	.76*	.33		1.43**	.38		.52*	.19		.34	.07	
Model 3	(Intercept)	1.46	.27	.02	1.40	.25	.00	.79	.17	.01	1.10	.06	.01
	T1	.28**	.09		.23**	.08		.35**	.09		-.07	.06	
	Relationship Status	-.11	.20		-.02	.18		-.14	.12		-.02	.04	
	Sexual Orientation	.74*	.33		1.41**	.39		.50*	.20		.34**	.07	
	Group Condition	-.23	.19		-.03	.18		-.10	.11		-.02	.03	

Note. N^a=73, N^b=70, N^c=68, N^d=58. *p < .05. ** p < .01. b = unstandardized beta weight. . MSP = Past month sex partners. MOSP = Past month opposite-sex partners. MVSP = Past month vaginal sex partners. MOrSP = Past month oral sex partners. Relationship status = Single (0) vs. Not Single (1). Sexual Orientation = Heterosexual (0) vs. Not Heterosexual (1).

Table 8. Analysis of changes in discussion of STIs with sexual partners in the past month from T1 to T3 as a function of background variables and group condition

		STITSPT3 [a]			STITOSPT3 [b]			STITVSPT3[c]			STITOrSPT3[d]		
		b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2	b	S.E.	ΔR^2
Model 1	(Intercept)	1.30	.44	.37**	1.29	.45	.38**	1.18	.51	.34**	.92	.47	.51**
	T1	.66**	.10		.66**	.10		.67**	.12		.76**	.11	
Model 2	(Intercept)	1.06	.47	.04	1.12	.48	.06*	1.11	.54	.03	.67	.50	.08*
	T1	.64**	.10		.62**	.10		.63**	.12		.71**	.11	
	Relationship Status	.46*	.21		.52*	.22		.42	.26		.65**	.22	
	Sexual Orientation	-.03	.35		-.23	.46		-.29	.43		-.24	.48	
Model 3	(Intercept)	1.15	.47	.01	1.25	.49	.01	1.24	.54	.03	.76	.50	.02
	T1	.65**	.10		.62**	.10		.64**	.12		.72**	.10	
	Relationship Status	.46*	.21		.51*	.22		.44	.26		.66**	.22	
	Sexual Orientation	-.04	.35		-.37	.47		-.35	.42		-.26	.48	
	Group Condition	-.24	.20		-.27	.21		-.40	.24		-.27	.21	

Note. N^a =73, N^b=70, N^c=68, N^d=58. *p < .05. ** p < .01. b = unstandardized beta weight. STITSP = Talked with sex partners about STIs. STITOSP = Talked with opposite sex partners about STIs. STITVSP = Talked with vaginal sex partners about STIs. STITOrSP = Talked with oral sex partners about STIs.

Table 9. Analysis of changes in use of barriers contraceptives with sexual partners in the past month from T1 to T3 as a function of background variables and group condition

		BCSPT3 [a]			BCOSPT3[b]			BCVSPT3[c]			BCOrSPT3[d]		
		b	S.E.	Δ R^2	b	S.E.	Δ R^2	b	S.E.	Δ R^2	b	S.E.	Δ R^2
Model 1	(Intercept)	.77	.42	.45**	.61	.39	.52**	.96	.31	.50**	-2.26	1.17	.43**
	T1	.78**	.10		.83**	.10		.68**	.09		1.44**	.24	
Model 2	(Intercept)	.74	.43	.05	.57	.40	.03	.89	.38	.00	-2.59	1.08	.13**
	T1	.78**	.10		.80**	.10		.68**	.09		1.52**	.22	
	Relationship Status	.17	.24		.27	.23		.05	.33		-.06	.09	
	Sexual Orientation	-.86*	.39		-.75	.47		.32	.53		-.67**	.18	
Model 3	(Intercept)	.95	.45	.01	.79	.43	.01	.82	.45	.00	-2.50	1.08	.02
	T1	.76**	.10		.78**	.10		.69**	.09		1.51**	.22	
	Relationship Status	.18	.24		.27	.23		.04	.34		-.06	.09	
	Sexual Orientation	-.88*	.39		-.90	.48		.34	.53		-.68**	.18	
	Group Condition	-.30	.23		-.29	.22		.10	.33		-.11	.08	

Note. N^a=73, N^b=70, N^c=68, N^d=57. *p < .05. ** p < .01. b = unstandardized beta weight. BCSP = Used barrier contraceptives with sexual partners. BCOSP = Used barrier contraceptives with opposite-sex sex partners. BCVSP = Used barrier contraceptives with vaginal sex partners. BCOrSP = Used barrier contraceptives with oral sex partners.

Table 10. Pearson Chi-Square results for positive change on dichotomous behavioral variables from T1 to T3.

	Intervention	Control	$\chi 2$(N)
	Change [a] (%)	Change [a] (%)	
HPV Vaccine	4(11.1)	2(5.4)	0.79(73)
HPV Info	13(68.4)	5(31.3)	4.80*(35)
Pap Smear	2(13.3)	1(7.1)	.30(29)
HIV Test	7(30.4)	0(0)	9.23**(49)
STIs Test	5(26.3)	2(12.5)	1.04(35)
	Change [b] (%)	Change [b] (%)	$\chi 2$(N)
Smoke	1 (16.7)	1(12.5)	.05(14)

Note. *p < .05. ** p < .01. [a]Participants who changed (change=1, no change=0) from No (1) to Yes (0) at T3 out of participants who said No (1) at T1. [b]Participants who changed (change=1, no change=0) from Yes (1) to No (0) at T3 out of participants who said Yes (1) at T1.

APPENDIX A: INTERVENTION OUTLINE

1. Introduction
    a. Confidentiality
    b. Group norms/expectations
2. HPV Factual Information (knowledge, attitudes)
    a. Types of HPV
        i. Focus on ‘high risk’ types
    b. Impact of infection
        i. Body’s natural response
        ii. HPV-related cancers
    c. Incidence and Prevalence of HPV
        i. Focus on adolescents and college women
    d. Incidence of HPV-related cancers
3. Risk factors for HPV exposure (knowledge, attitudes)
    a. Sexual behaviors
4. Risk factors for serious HPV infection/pre-cancer (knowledge, attitudes)
    a. Lifestyle & health behaviors
5. HPV risk reduction (knowledge, attitudes)
    a. Sexual behaviors
    b. Lifestyle & health behaviors
    c. Infection management (if already infected)
6. HPV detection, diagnosis, and treatment (knowledge, attitudes)

7. Addressing perceived obstructions to behavioral activation (perceived behavioral control)
    a. Acknowledgement and normalization of perceived barriers (subjective norms, perceived behavioral control)
    b. Societal expectations/endorsement of target behaviors (subjective norms)
    c. Importance of engaging in risk reduction and prevention behaviors (attitudes)
8. Skills building and encouragement for behavioral activation (subjective norms, perceived behavioral control)
    a. Decision-making strategies
        i. Barrier contraceptive use
    b. Communication strategies
        i. Talking with partners regarding contraceptive use and STI testing history
        ii. Disclosing sexual history
        iii. Purchasing barriers contraceptives
    c. Problem-solving strategies
        i. Dealing with partner objections
        ii. Locating health providers and ensuring insurance coverage
        iii. Locating and purchasing barriers contraceptives
        iv. Proper use of barrier contraceptives
9. Intervention Wrap-Up
    a. Additional questions/concerns

APPENDIX B: PART 1 AND 2 STUDY DESCRIPTION FOR UNCC SONASYSTEMS®

Study Name Behaviors - Part One

Abstract Two part study. This is PART 1.Part 1 takes place in Psychology Lab (120 minutes, 2 credits) Part 2 is completed online (45 minutes, 1 credit + entry into drawing to win one of ten $50 Target gift certificates)

Description This is a two-part study focusing on the sexual health practices of college women aged 18 to 24 who have engaged in anal, oral, and/or vaginal sex in the past month. For Part 1, you will be asked to come to the Psychology Lab and fill out a computerized survey relating to sexual health knowledge, practices, and beliefs. These questions are sensitive in nature and all possible steps to protect the confidentiality of the information will be taken. You will provide data using computer-based surveys using a unique code known only to you. With the use of the code, the data will remain anonymous to everyone except you. The surveys are encrypted using SSL. Data will be stored in a password-protected folder on a password-protected network drive accessible only by the principal investigator and the faculty members listed on the IRB protocol. Signed informed consent forms will be kept in a locked file cabinet and will be stored completely separate and apart from any data. These documents will be shredded upon completion of the study. You will then participate in one of two educational programs with a maximum of 8 other participants. Based on your group assignment, you may participate in an educational program about study skills or you may participate in an educational program about health and sexual relationships. After the educational program, you will be asked to complete another survey based on your experience with the program. You must sign up separately for Part 2 (STI-Part Two). For Part 2, you will be emailed a link 28 days after completing Part 1. This link will direct you to a survey focusing on aspects of sexual health in relation to STIs. Your participation in Part 1 of this project will take approximately 2 hours. Part 2 will take approximately 45 minutes. Part 1 and Part 2 of the study will be conducted one month apart. The benefits of participation in this study are the accumulation of 2 Research Requirement points at completion of Part 1 and 1 point at completion of Part 2, totaling 3 points towards the Research Requirement points for UNCC Introductory Psychology. Additionally, upon completion of Part 2 of the study, you will be entered into drawing to win one of ten $50 gift certificates.

Study Name Behaviors - Part Two

Abstract THIS IS PART 2 of the two-part Behaviors Study. You must wait 28 days

after completing Part 1. Part 2 is completed online (45 minutes, 1 credit + entry into drawing to win one of ten $50 gift certificates), resulting in a one in twelve chance of winning a gift certificate

Description This is the second part of the two part study focusing on the sexual health practices of college women aged 18 to 24 who have engaged in anal, oral, and/or vaginal sex in the past month. For Part 2, you will be emailed a link 28 days after completing Part 1. This link will direct you to a survey focusing on aspects of sexual health in relation to STIs. Part 2 will take approximately 45 minutes. These questions are sensitive in nature and all possible steps to protect the confidentiality of the information will be taken. You will provide data using computer-based surveys using a unique code known only to you. With the use of the code, the data will remain anonymous to everyone except you. The surveys are encrypted using SSL. Data will be stored in a password-protected folder on a password-protected network drive accessible only by the principal investigator and the faculty members listed on the IRB protocol. Signed informed consent forms will be kept in a locked file cabinet and will be stored completely separate and apart from any data. These documents will be shredded upon completion of the study.

Part 1 and Part 2 of the study will be conducted one month apart. You will receive 1 point at completion of Part 2 and will be entered into a drawing to win one of ten $50 Target gift certificates.

APPENDIX C: PRE-SCREEN QUESTIONS FOR UNCC SONASYSTEMS®

Underlined items indicate eligibility assuming all red items selected.

1. Are you female?
    a. Yes
    b. No
2. Have you engaged in oral, anal, and/or vaginal sex in the past month?
    a. Yes
    b. No
3. Have you received the HPV vaccine?
    a. Yes
    b. No
4. Are you between 18-24 years old?
    a. Yes
    b. No

APPENDIX D: PRE-TEST (T1) AND FOLLOW-UP (T3) MEASURES

1) Please enter the first three letters of your middle name, the first three letters of your birth city, and the first three letters of you mother's maiden name. For example, my name is Jocelyn Brineman Sweeney, I was born in Stuttgart, Germany, and my mother's name before she was married was Carolyn Terri Denniston. Therefore, I would enter BriStuDen

Demographics
Please answer the following questions

2) Age

3) Race
- American-Indian/Alaska Native
- Asian-American/Asian Origin/Pacific Islander
- African-American/Non-Hispanic Black/African Origin
- White/European Origin/Caucasian
- Hispanic/Latino/a
- Bi-racial/Multi-racial
- Other:

4) Year in School
- Freshman
- Sophomore
- Junior
- Senior
- Post-Bach
- Graduate
- Other:

5) What is your relationship status?
- Single and not dating
- Single but dating one or more people
- In a relationship but not living together
- Living with a partner but not married
- Married

6) How long have you been in a relationship?
- Less than 1 month
- Between 1 and 3 months
- Between 4 and 6 months
- Between 7 months and a year
- Over a year

7) Sexual Orientation

- Heterosexual
- Lesbian
- Bisexual
- Other:

Sexual Health and History Survey
Please answer the following questions

8) Have you ever had vaginal sex with a person of the opposite sex?
- Yes
- No

9) How many opposite-sex vaginal sex partners have you had in your lifetime?

10) How old were you when you first had vaginal sex with a partner of the opposite sex?
- Under 12
- Between 12 and 15
- Between 16 and 18
- Between 19 and 21
- Over 21

11) Have you had vaginal sex with a person of the opposite sex in the past 1 month?
- Yes
- No

12) How many opposite-sex vaginal sex partners have you had in the past month?

13) In the past 1 month, how often did you discuss sexually transmitted infections (STIs)/human immunodeficiency virus (HIV) with opposite-sex vaginal sex partners?
- Never
- Rarely
- Sometimes
- Often
- Always

14) What factors, if any, prohibited discussion with your opposite-sex vaginal sex partners about STIs/HIV?
- Not applicable
- I didn't want to
- My partner(s) didn't want to
- Other:

15) Approximately how many times have you had vaginal sex with opposite-sex partners in the past 1 month?

16) How often did you use a barrier contraceptive (e.g., condoms) during vaginal sex with opposite-sex partners in the past 1 month?
- Never
- Rarely
- Sometimes

- Often
- Always

17) What prevented you from using barrier contraceptives during vaginal sex with opposite-sex partners in the past 1 month?
- Not applicable
- I didn't want to
- My partner(s) didn't want to
- Other:

18) In the past 1 month, how often did you use alcohol or drugs when you had vaginal sex with an opposite-sex partner?
- Never
- Rarely
- Sometimes
- Often
- Always

19) Have you ever had anal sex with a person of the opposite sex?
- Yes
- No

20) How many opposite-sex anal sex partners have you had in your lifetime?

21) How old were you when you first had anal sex with a partner of the opposite sex?
- Under 12
- Between 12 and 15
- Between 16 and 18
- Between 19 and 21
- Over 21

22) Have you had anal sex with a person of the opposite sex in the past 1 month?
- Yes
- No

23) How many opposite-sex anal sex partners have you had in the past 1 month?

24) In the past 1 month, how often did you discuss sexually transmitted infections (STIs)/human immunodeficiency virus (HIV) with opposite-sex anal sex partners?
- Never
- Rarely
- Sometimes
- Often
- Always

25) What factors, if any, prohibited you from talking with your opposite-sex anal sex partners about STIs/HIV?
- Not applicable
- I didn't want to
- My partner(s) didn't want to
- Other:

26) Approximately how many times have you had anal sex with opposite-sex partners in the past 1 month?

27) How often did you use a barrier contraceptive (e.g., condoms) during anal sex wtih opposite-sex partners in the past 1 month?
- Never
- Rarely
- Sometimes
- Often
- Always

28) What prevented you from using barrier contraceptives during anal sex with opposite-sex partners in the past 1 month?
- Not applicable
- I didn't want to
- My partner(s) didn't want to
- Other:

29) In the past 1 month, how often did you use alcohol or drugs when you had anal sex with opposite-sex partners?
- Never
- Rarely
- Sometimes
- Often
- Always

30) Have you ever had oral sex with a person of the opposite sex?
- Yes
- No

31) How many opposite-sex oral sex partners have you had in your lifetime?

32) How old were you when you first had oral sex with a partner of the opposite-sex?
- Under 12
- Between 12 and 15
- Between 16 and 18
- Between 19 and 21
- Over 21

33) Have you had oral sex with a person of the opposite sex in the past 1 month?
- Yes
- No

34) How many opposite-sex oral sex partners have you had in the past 1 month?

35) In the past 1 month, how often did you discuss sexually transmitted infections (STIs)/human immunodeficiency virus (HIV) with new opposite-sex oral sex partners?
- Never
- Rarely
- Sometimes
- Often
- Always

36) What prevented you from talking with your opposite-sex oral sex partners about STIs/HIV?
- Not applicable
- I didn't want to
- My partner(s) didn't want to
- Other:

37) Approximately how many times have you had oral sex with opposite-sex partners in the past 1 month?

38) How often did you use a barrier contraceptive (e.g., condoms) during oral sex with opposite-sex partners in the past 1 month?
- Never
- Rarely
- Sometimes
- Often
- Always

39) What prevented you from using barrier contraceptives during oral sex with opposite-sex partners in the past 1 month?
- Not applicable
- I didn't want to
- My partner(s) didn't want to
- Other:

40) In the past 1 month, how often did you use alcohol or drugs when you had oral sex with an opposite-sex partner?
- Never
- Rarely

- Sometimes
- Often
- Always

41) Have you ever had vaginal sex with a person of the same sex?
- Yes
- No

42) How many same-sex vaginal sex partners have you had in your lifetime?

43) How old were you the first time you had vaginal sex with a partner of the same-sex?
- Under 12
- Between 12 and 15
- Between 16 and 18
- Between 19 and 21
- Over 21

44) Have you had vaginal sex with a person of the same sex in the past 1 month?
- Yes
- No

45) How many same-sex vaginal sex partners have you had in the past 1 month?

46) In the past 1 month, how often did you discuss sexually transmitted infections (STIs)/human immunodeficiency virus (HIV) with same-sex vaginal sex partners?
- Never
- Rarely
- Sometimes
- Often
- Always

47) What factors, if any, prohibited discussion with your same-sex vaginal sex partners about STIs/HIV?
- Not applicable
- I didn't want to
- My partner(s) didn't want to
- Other:

48) Approximately how many times have you had vaginal sex with same-sex partners in the past 1 month?

49) How often did you use a barrier contraceptive (e.g., condoms) during vaginal sex with same-sex partners in the past 1 month?
- Never
- Rarely

- Sometimes
- Often
- Always

50) What prevented you from using barrier contraceptives during vaginal sex with same-sex partners in the past 1 month?
- Not applicable
- I didn't want to
- My partner(s) didn't want to
- Other:

51) In the past 1 month, how often did you use alcohol or drugs when you had vaginal sex with same-sex partners?
- Never
- Rarely
- Sometimes
- Often
- Always

52) Have you ever had oral sex with a person of the same sex?
- Yes
- No

53) How many same-sex oral sex partners have you had in your lifetime?

54) How old were you when you first had oral sex with a partner of the same sex?
- Under 12
- Between 12 and 15
- Between 16 and 18
- Between 19 and 21
- Over 21

55) Have you had oral sex with a person of the same sex in the past 1 month?
- Yes
- No

56) How many same-sex oral sex partners have you had in the past 1 month?

57) In the past 1 month, how often did you discuss sexually transmitted infections (STIs)/human immunodeficiency virus (HIV) with same-sex oral sex partners?
- Never
- Rarely
- Sometimes
- Often
- Always

58) What prevented you from talking with your same-sex oral sex partners about STIs/HIV?
- Not applicable
- I didn't want to
- My partner(s) didn't want to
- Other:

59) Approximately how many times have you had oral sex with same-sex partners in the past 1 month?

60) How often did you use a barrier contraceptive (e.g., condoms) during oral sex with same-sex partners in the past 1 month?
- Never
- Rarely
- Sometimes
- Often
- Always

61) What prevented you from using barrier contraceptives during oral sex with same-sex partners in the past 1 month?
- Not applicable
- I didn't want to
- My partner(s) didn't want to
- Other:

62) In the past 1 month, how often did you use alcohol or drugs when you had oral sex with a same-sex partner?
- Never
- Rarely
- Sometimes
- Often
- Always

63) Have you received one or more human papillomavirus (HPV) vaccines?
- Yes
- No

64) Have you sought out any information on HPV?
- Yes
- No

65) What sources did you use?
- Internet
- Doctor

- Friend
- Partner
- Parent
- Professor
- Other:

66) Have you ever had a Pap smear?
- Yes
- No

67) Have you ever had an abnormal Pap smear?
- Yes
- No

68) Have you ever been tested for human immunodeficiency virus (HIV)?
- Yes
- No

69) Do you currently smoke cigarettes?
- Yes
- No

70) Do you use hormonal contraceptives (birth control)?
- Yes
- No

71) Are you trying to get pregnant?
- Yes
- No

72) Have you ever been tested for a sexually transmitted infection (STI)?
- Yes
- No

73) Have you ever been diagnosed with an STI?
- Yes
- No

74) Which STIs have you received a diagnosis for?
- Herpes
- Gonorrhea
- Human papillomavirus (HPV)
- Genital warts
- Chlamydia
- Syphilis
- Other:

HPV Knowledge Scale
Please mark the following statements about HPV (human papillomavirus) as True, False, or Not Sure

75) There are many types of HPV
- True
- False
- Not Sure

76) HPV causes HIV/AIDS
- True
- False
- Not Sure

77) Antibiotics can cure HPV
- True
- False
- Not Sure

78) You can always tell when someone else has HPV
- True
- False
- Not Sure

79) HPV causes abnormal Pap smears
- True
- False
- Not Sure

80) Only women get HPV
- True
- False
- Not Sure

81) HPV causes herpes
- True
- False
- Not Sure

82) HPV affects your ability to get pregnant
- True
- False
- Not Sure

83) HPV is a virus

- True
- False
- Not Sure

84) A vaccine may prevent HPV
- True
- False
- Not Sure

85) HPV causes genital warts
- True
- False
- Not Sure

86) You can have HPV without knowing it
- True
- False
- Not Sure

87) HPV can be cured
- True
- False
- Not Sure

88) HPV is spread on toiled seats
- True
- False
- Not Sure

89) HPV is sexually transmitted infection
- True
- False
- Not Sure

90) HPV causes cervical cancer
- True
- False
- Not sure

91) You can get HPV through poor personal hygiene
- True
- False
- Not Sure

92) Even if you do not see a wart, you can transmit HPV

- True
- False
- Not Sure

93) You can decrease the chance of transmitting warts during intercourse

- True
- False
- Not Sure

94) Using a condom will decrease the chance of transmitting warts

- True
- False
- Not Sure

Future Intentions Survey
Please respond to the following questions

95) To what degree do you intend to reduce your risk of exposure to HPV (human papillomavirus)?
- I do not intend to
- Undecided
- I intend to

96) To what degree do you intend to use condoms wtih a sexual partner in the next month?
- I do not intend to
- Undecided
- I intend to

97) To what degree do you intend to reduce the number of new sexual partners in the next month?
- I do not intend to
- Undecided
- I intend to

98) To what degree do you intend to engage in unprotected vaginal sex in the next month?
- I do not intend to
- Undecided
- I intend to

99) To what degree do you intend to engage in unprotected anal sex in the next month?
- I do not intend to
- Undecided
- I intend to

100) To what degree do you intend to engage in unprotected oral sex in the next month?
- I do not intend to
- Undecided
- I intend to

101) To what degree do you intend to get tested for sexually transmitted infections (STIs) in the next month?
- I do not intend to
- Undecided
- I intend to

102) To what degree do you intend to discuss sexually transmitted infections (STIs)/human immunodeficiency virus (HIV) with your sexual partner(s) in the next month?

- I do not intend to
- Undecided
- I intend to

103) To what degree do you intend to receive a Pap smear in the next 12 months?

- I do not intend to
- Undecided
- I intend to

104) To what degree do you intend to receive at least one of the human papillomavirus (HPV) vaccines in the next 12 months?

- I do not intend to
- Undecided
- I intend to
- I've already started/completed the HPV vaccine series

Attitudes Towards Intentions
Please respond to the following questions.

105) Reducing my risk of exposure to HPV (human papillomavirus) is
- Beneficial
- Neither beneficial nor harmful
- Harmful

106) Reducing my risk of exposure to HPV is
- Good
- Neither good nor bad
- Bad

107) Using condoms with a partner is
- Unpleasant
- Neither pleasant nor unpleasant
- Pleasant

108) Using condoms with a partner is
- Beneficial
- Neither beneficial nor harmful
- Harmful

109) Reducing the number of new sex partners I have is
- Good
- Neither good nor bad
- Bad

110) Reducing the number of new sex partners I have is
- Worthless
- Neither worthless nor useful
- Useful

111) Engaging in unprotected vaginal sex can be
- Harmful
- Neither harmful nor beneficial
- Beneficial

112) Engaging in unprotected vaginal sex can be
- Good
- Neither good nor bad
- Bad

113) Engaging in unprotected anal sex can be
- Harmful

- Neither harmful nor beneficial
- Beneficial

114) Engaging in unprotected anal sex can be
- Good
- Neither good nor bad
- Bad

115) Engaging in unprotected oral sex can be
- Harmful
- Neither harmful nor beneficial
- Beneficial

116) Engaging in unprotected oral sex can be
- Good
- Neither good nor bad
- Bad

117) Getting tested for sexually transmitted infections (STIs) is
- Worthless
- Neither worthless nor useful
- Useful

118) Getting tested for sexually transmitted infections (STIs) is
- Harmful
- Neither harmful nor beneficial
- Beneficial

119) Discussing STIs/HIV with your sexual partner(s) is
- Worthless
- Neither worthless nor useful
- Useful

120) Discussing STIs/HIV with your sexual partner(s) is
- Harmful
- Neither harmful nor beneficial
- Beneficial

121) Receiving a Pap smear is
- Good
- Neither good nor bad
- Bad

122) Receiving a Pap smear is
- Harmful

- Neither harmful nor beneficial
- Beneficial

123) Receiving the HPV vaccines is
- Harmful
- Neither harmful nor beneficial
- Beneficial

124) Receiving the HPV vaccines is
- Worthless
- Neither worthless nor useful
- Useful

Subjective Norms
Please respond to the following questions

125) I feel under social pressure to reduce my risk of exposure to HPV (human papillomavirus)
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

126) I feel under social pressure to use a condom with a partner
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

127) I feel under social pressure to reduce the number of new sex partners I have
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

128) I feel under social pressure to engage in unprotected vaginal sex
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

129) I feel under social pressure to engage in unprotected anal sex
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

130) I feel under social pressure to engage in unprotected oral sex
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

131) I feel under social pressure to get tested for sexually transmitted infections (STIs)
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

132) I feel under social pressure to discuss STIs/HIV with sexual partners
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

133) I feel under social pressure to receive a Pap smear
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

134) I feel under social pressure to receive the HPV vaccines
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

Perceived Behavioral Control
Please respond to the following questions

135) I am confident that I can reduce my risk of exposure to HPV (human papillomavirus) if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

136) I am confident that I can use a condom with a sexual partner if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

137) I am confident that I can reduce the number of new sexual partners I have if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

138) I am confident that I can engage in unprotected vaginal sex if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

139) I am confident that I can engage in unprotected anal sex if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

140) I am confident that I can engage in unprotected oral sex if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree

- Strongly Agree

141) I am confident that I can get tested for sexually transmitted infections (STIs) if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

142) I am confident that I can discuss STIs/HIV with sexual partners if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

143) I am confident that I can receive a Pap smear if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

144) I am confident that I can receive the HPV vaccines if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

145) Whether or not I reduce my risk of exposure to HPV is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

146) Whether or not I use a condom with a sexual partner is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

147) Whether or not I reduce the number of new sex partners I have is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

148) Whether or not I engage in unprotected vaginal sex is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

149) Whether or not I engage in unprotected anal sex is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

150) Whether or not I engage in unprotected oral sex is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

151) Whether or not I get tested for sexually transmitted infections (STIs) is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

152) Whether or not I discuss STIs/HIV with sexual partners is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

153) Whether or not I receive a Pap smear is entirely up to me
- Strongly Disagree

- Disagree
- Undecided
- Agree
- Strongly Agree

154) Whether or not I receive the HPV vaccines is entirely up to me

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

APPENDIX E: POST-TEST (T2) MEASURES

1) Please indicate the topic of your educational intervention
   - A group discussion with the researcher, Jocelyn, about HPV
   - An online video about study skills

2) Please enter the first three letters of your middle name, the first three letters of your birth city, and the first three letters of you mother's maiden name. For example, my name is Jocelyn Brineman Sweeney, I was born in Stuttgart, Germany, and my mother's name before she was married was Carolyn Terri Denniston. Therefore, I would enter BriStuDen

HPV Knowledge Scale
Please mark the following statements about HPV (human papillomavirus) as True, False, or Not Sure

3) There are many types of HPV
- True
- False
- Not Sure

4) HPV causes HIV/AIDS
- True
- False
- Not Sure

5) Antibiotics can cure HPV
- True
- False
- Not Sure

6) You can always tell when someone else has HPV
- True
- False
- Not Sure

7) HPV causes abnormal Pap smears
- True
- False
- Not Sure

8) Only women get HPV
- True
- False
- Not Sure

9) HPV causes herpes
- True
- False
- Not Sure

10) HPV affects your ability to get pregnant
- True
- False
- Not Sure

11) HPV is a virus

- True
- False
- Not Sure

12) A vaccine may prevent HPV
- True
- False
- Not Sure

13) HPV causes genital warts
- True
- False
- Not Sure

14) You can have HPV without knowing it
- True
- False
- Not Sure

15) HPV can be cured
- True
- False
- Not Sure

16) HPV is spread on toiled seats
- True
- False
- Not Sure

17) HPV is sexually transmitted infection
- True
- False
- Not Sure

18) HPV causes cervical cancer
- True
- False
- Not sure

19) You can get HPV through poor personal hygiene
- True
- False
- Not Sure

20) Even if you do not see a wart, you can transmit HPV

- True
- False
- Not Sure

21) You can decrease the chance of transmitting warts during intercourse

- True
- False
- Not Sure

22) Using a condom will decrease the chance of transmitting warts

- True
- False
- Not Sure

Future Intentions Survey
Please respond to the following questions

23) To what degree do you intend to reduce your risk of exposure to HPV (human papillomavirus)?
- I do not intend to
- Undecided
- I intend to

24) To what degree do you intend to use condoms wtih a sexual partner in the next month?
- I do not intend to
- Undecided
- I intend to

25) To what degree do you intend to reduce the number of new sexual partners in the next month?
- I do not intend to
- Undecided
- I intend to

26) To what degree do you intend to engage in unprotected vaginal sex in the next month?
- I do not intend to
- Undecided
- I intend to

27) To what degree do you intend to engage in unprotected anal sex in the next month?
- I do not intend to
- Undecided
- I intend to

28) To what degree do you intend to engage in unprotected oral sex in the next month?
- I do not intend to
- Undecided
- I intend to

29) To what degree do you intend to get tested for sexually transmitted infections (STIs) in the next month?
- I do not intend to
- Undecided
- I intend to

30) To what degree do you intend to discuss sexually transmitted infections (STIs)/human immunodeficiency virus (HIV) with your sexual partner(s) in the next month?
- I do not intend to
- Undecided
- I intend to

31) To what degree do you intend to receive a Pap smear in the next 12 months?
- I do not intend to
- Undecided
- I intend to

32) To what degree do you intend to receive at least one of the human papillomavirus (HPV) vaccines in the next 12 months?
- I do not intend to
- Undecided
- I intend to
- I've already started/completed the HPV vaccine series

Attitudes Towards Intentions
Please respond to the following questions.

33) Reducing my risk of exposure to HPV (human papillomavirus) is
- Beneficial
- Neither beneficial nor harmful
- Harmful

34) Reducing my risk of exposure to HPV is
- Good
- Neither good nor bad
- Bad

35) Using condoms with a partner is
- Unpleasant
- Neither pleasant nor unpleasant
- Pleasant

36) Using condoms with a partner is
- Beneficial
- Neither beneficial nor harmful
- Harmful

37) Reducing the number of new sex partners I have is
- Good
- Neither good nor bad
- Bad

38) Reducing the number of new sex partners I have is
- Worthless
- Neither worthless nor useful
- Useful

39) Engaging in unprotected vaginal sex can be
- Harmful
- Neither harmful nor beneficial
- Beneficial

40) Engaging in unprotected vaginal sex can be
- Good
- Neither good nor bad
- Bad

41) Engaging in unprotected anal sex can be
- Harmful

- Neither harmful nor beneficial
- Beneficial

42) Engaging in unprotected anal sex can be
- Good
- Neither good nor bad
- Bad

43) Engaging in unprotected oral sex can be
- Harmful
- Neither harmful nor beneficial
- Beneficial

44) Engaging in unprotected oral sex can be
- Good
- Neither good nor bad
- Bad

45) Getting tested for sexually transmitted infections (STIs) is
- Worthless
- Neither worthless nor useful
- Useful

46) Getting tested for sexually transmitted infections (STIs) is
- Harmful
- Neither harmful nor beneficial
- Beneficial

47) Discussing STIs/HIV with your sexual partner(s) is
- Worthless
- Neither worthless nor useful
- Useful

48) Discussing STIs/HIV with your sexual partner(s) is
- Harmful
- Neither harmful nor beneficial
- Beneficial

49) Receiving a Pap smear is
- Good
- Neither good nor bad
- Bad

50) Receiving a Pap smear is
- Harmful

- Neither harmful nor beneficial
- Beneficial

51) Receiving the HPV vaccines is
- Harmful
- Neither harmful nor beneficial
- Beneficial

52) Receiving the HPV vaccines is
- Worthless
- Neither worthless nor useful
- Useful

Subjective Norms
Please respond to the following questions

53) I feel under social pressure to reduce my risk of exposure to HPV (human papillomavirus)
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

54) I feel under social pressure to use a condom with a partner
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

55) I feel under social pressure to reduce the number of new sex partners I have
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

56) I feel under social pressure to engage in unprotected vaginal sex
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

57) I feel under social pressure to engage in unprotected anal sex
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

58) I feel under social pressure to engage in unprotected oral sex
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

59) I feel under social pressure to get tested for sexually transmitted infections (STIs)
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

60) I feel under social pressure to discuss STIs/HIV with sexual partners
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

61) I feel under social pressure to receive a Pap smear
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

62) I feel under social pressure to receive the HPV vaccines
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

Perceived Behavioral Control
Please respond to the following questions

63) I am confident that I can reduce my risk of exposure to HPV (human papillomavirus) if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

64) I am confident that I can use a condom with a sexual partner if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

65) I am confident that I can reduce the number of new sexual partners I have if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

66) I am confident that I can engage in unprotected vaginal sex if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

67) I am confident that I can engage in unprotected anal sex if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

68) I am confident that I can engage in unprotected oral sex if I want to
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

69) I am confident that I can get tested for sexually transmitted infections (STIs) if I want to

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

70) I am confident that I can discuss STIs/HIV with sexual partners if I want to

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

71) I am confident that I can receive a Pap smear if I want to

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

72) I am confident that I can receive the HPV vaccines if I want to

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

73) Whether or not I reduce my risk of exposure to HPV is entirely up to me

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

74) Whether or not I use a condom with a sexual partner is entirely up to me

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

75) Whether or not I reduce the number of new sex partners I have is entirely up to me

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

76) Whether or not I engage in unprotected vaginal sex is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

77) Whether or not I engage in unprotected anal sex is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

78) Whether or not I engage in unprotected oral sex is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

79) Whether or not I get tested for sexually transmitted infections (STIs) is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

80) Whether or not I discuss STIs/HIV with sexual partners is entirely up to me
- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

81) Whether or not I receive a Pap smear is entirely up to me
- Strongly Disagree

- Disagree
- Undecided
- Agree
- Strongly Agree

82) Whether or not I receive the HPV vaccines is entirely up to me

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

APPENDIX F: INFORMED CONSENT FORM

UNCC Department of Psychology
9201 University City Boulevard
Charlotte, NC 28223

Informed Consent for
Behaviors Part 1 and Part 2

Project Title and Purpose:
You are invited to participate in a research study titled *Behaviors*. This is a two-part study focusing on the sexual health practices of college women aged 18 to 24 who have engaged in anal, oral, and/or vaginal sex in the past month.

Investigator(s):
This study is being conducted by Jocelyn Sweeney as well as Dr. Rick McAnulty of the UNCC Psychology Department. Anam Barakzai will assist with data collection.

Description of Participation:
For Part 1, you will be asked to fill out a computerized survey relating to sexual health knowledge, practices, and beliefs. More specifically, you will be asked about your experience with anal, oral, and vaginal sex, condom use, along with questions about sexually transmitted infections (STI) and other related behaviors. You will then participate in one of two educational programs with a maximum of 8 other participants. Based on your group assignment, you may participate in an educational program about study skills or you may participate in an educational program about health and sexual relationships. After the educational program, you will be asked to complete another survey based on your experience with the program. For Part 2, you will be asked to complete another survey once again focusing on aspects of sexual health in relation to STIs. This survey will be completed online from your own computer or a computer of your choice. Your email addresses will collected through the UNCC SonaSystem® and you will be emailed with information regarding how to access the survey **28** days after completing Part 1. The information gathered in the surveys is sensitive in nature and all possible steps to protect the confidentiality of the information will be taken.

Length of Participation
Your participation in Part 1 of this project will take approximately 2 hours. During this time you will be completing two surveys and participating in one of two educational programs. The first survey is 154 items and will take approximately 35 minutes to complete. The educational programs will take approximately 45 minutes to 1 hour to complete. The second survey is 81 items and will take approximately 20 minutes to complete. For Part 2, you will also be completing a 154 item survey which will take you approximately 35 minutes. Part 1 and Part 2 of the study will be conducted one month apart. If you decide to participate, you will be one of 116 participants in the study.

Risks and Benefits of Participation:
The risks associated with this study are minimal. It is possible that you may become distressed or embarrassed when divulging personal information about your sexual practices on the electronic survey. You may feel uncomfortable due to the sensitive, possibly stigmatizing nature of the information you are providing and view the procedure as a violation of your privacy. However, this distress is expected to be minimal and short-lasting. The groups will include no more 8 participants. All participants will be reminded of the importance of keeping any participant information confidential.

All data in Part 1 will be conducted in the UNCC psychology computer lab on computers that are spaced at least 3 feet apart to ensure privacy or on private computers. Data collection for Part 2 of the study will be completed from your own personal computer or a computer of your choice. Data will be completed through SurveyShare® and will be protected with SSL encryption. The completed data will then be transferred and stored in a password-protected folder on a password protected network drive accessible by only the principal investigator, Dr. Rick McAnulty, Anam Barakzai, and the three additional faculty members listed under the current IRB protocol. Only the principal investigator and those listed under the current IRB protocol will have access to the data in order to analyze data for completion of dissertation and future manuscripts.

Your data will be linked by time points through the use of a unique identifier. This identifier will consist of the first three letters of their middle name, the first three letters of their birth city, and the first three letters of their mother's maiden name, resulting in a 9-letter code. You will be asked to provide this identifier on SurveyShare® each time you complete the surveys. Your name will never be associated with their identifier and will remain unknown to the principal investigator.

You will be asked to report any adverse events to either Jocelyn Sweeney or Dr. Rick McAnulty. Any indication of emotional distress as a result of the study will be immediately referred to the UNC Charlotte Counseling Center or other appropriate mental health services. Additionally, you will be reminded that they are able to drop out of the study at any time. There may be additional risks that are currently unforeseeable.

The benefits of participation in this study are the accumulation of 2 Research Requirement points at completion of Part 1 and 1 point at completion of Part 2, totaling 3 points towards the Research Requirement points for UNCC Introductory Psychology. Additionally, upon completion of Part 2 of the study, you will be entered into a drawing for a chance to receive one of ten $50 Target gift certificates, resulting in a one in twelve chance of receiving a gift certificate.

By participating in this study, you are furthering the understanding of ways to reduce the risk of certain sexually transmitted infections (STIs). By gaining a better understanding of methods of risk reduction and prevention, healthcare providers and educators can be more effective in their efforts to intercede and prevent infection with certain STIs, or, if already infected, prevent more negative consequences from occurring.

Email Contact
It is important that you check your campus email while participating in this study. You will receive three emails from Jocelyn Sweeney. You will receive the first email 21 days after completing Part 1 of this study. This email will serve as a reminder for Part2. You will receive the second email 28 days after completing Part 1. This email will contain the information you need to complete Part 2. You will also receive a third email after you complete Part 2. This

email will serve to thank you for your participation in the study and will also provide contact information for the UNCC Counseling Center, the UNCC Student Health Center, the UNCC Research Compliance Office, Jocelyn Sweeney, and Dr. Rick McAnulty. If you are the winner of a gift card, you will also receive a fourth email from Jocelyn Sweeney providing instructions on how to claim your gift card.

Volunteer Statement:
You are a volunteer. The decision to participate in this study is completely up to you. If you decide to be in the study, you may stop at any time. You will not be treated any differently if you decide not to participate or if you stop once you have started.

Confidentiality:
Any information about your participation, including your identity, is confidential. The following steps will be taken to ensure this confidentiality:

You will provide data using computer-based surveys using a unique code known only to you. With the use of the code, the data will remain anonymous to everyone except you. The surveys are encrypted using SSL. Data will be stored in a password-protected folder on a password-protected network drive accessible by only the principal investigator, Dr. Rick McAnulty, Anam Barakzai and the three additional faculty members listed under the current IRB protocol. Signed informed consent forms will be kept in a locked file cabinet and will be stored completely separate and apart from any data. These documents will be shredded upon completion of the study.

Data will be linked using a unique identifier that will never be associated with your name, therefore, the data you provide will be anonymous. Your identifier will be known only to you. No one else, including the researchers, will know your code.

Fair Treatment and Respect:
UNC Charlotte wants to make sure that you are treated in a fair and respectful manner. Contact the University's Research Compliance Office (704.687.3309) if you have any questions about how you are treated as a study participant. If you have any questions about the project, please contact Jocelyn Sweeney (jbrinema@uncc.edu) or Dr. Rick McAnulty (704.687.4783 or rdmcanul@uncc.edu).

Participant Consent
I have read the information in this consent form. I have had the chance to ask questions about this study, and those questions have been answered to my satisfaction. I am at least 18 years of age, and I agree to participate in this research project. I understand that I will receive a copy of this form after it has been signed by me and the Principal Investigator.

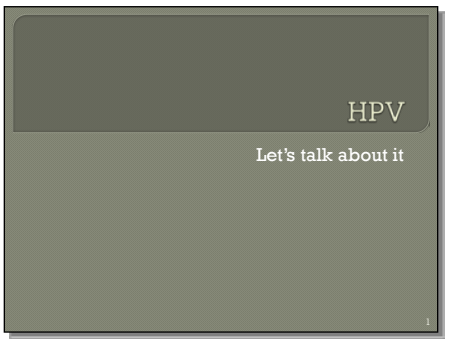
_____ _____ _____

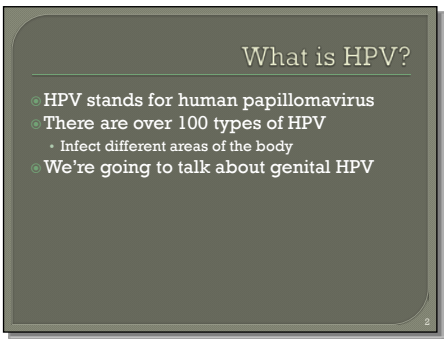
Participant Name (PRINT) Participant Signature DATE

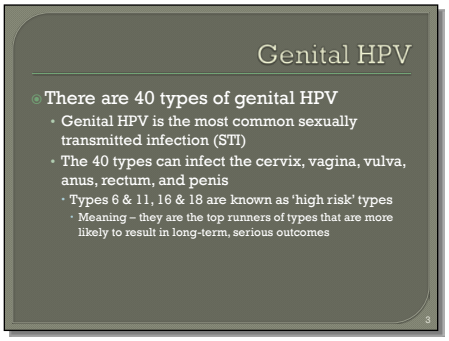
_____ _____

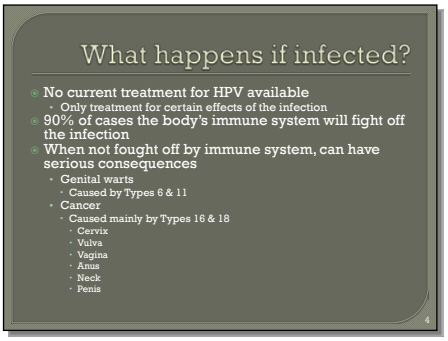
Investigator Signature DATE

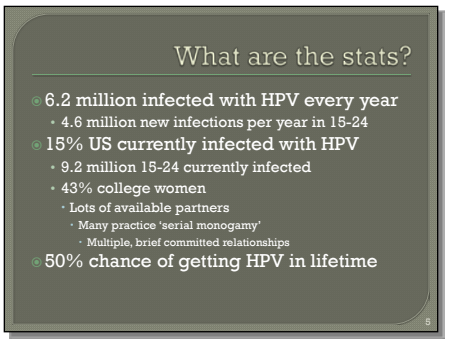
APPENDIX G: INTERVENTION POWER POINT SLIDES

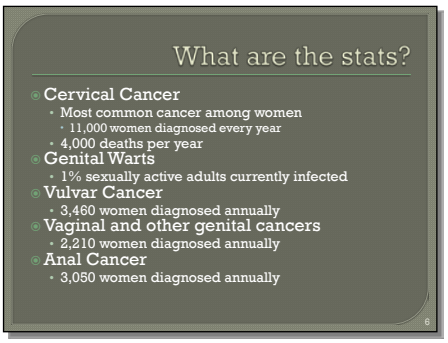












HPV & Me

7

Am I at risk for HPV?

- HPV is transmitted through genital contact
  - so…if you've ever had anal, oral, and/or vaginal sex then
    - YES - you are at risk
      - There are certain things that can place you at an even higher risk of becoming infected with HPV

8

What's going to increase my risk of infection?

- Factors that increase your risk of infection are…
  - Multiple sex partners
    - Increasing likelihood of being exposed
  - Anal, oral, or vaginal sex without protective barriers
    - Aka – condoms, female condoms, dental dam, etc.
  - Sex with someone who has had a lot of sex partners
    - More likely to carry the infection
  - Sex at early age
    - Earlier exposure to the infection

9

What puts me at risk of the infection become severe?

- Factors that increase the risk of the infection becoming more serious (e.g., cervical cancer)
  - Infrequent STI testing
    - Not being aware of infection so symptoms (e.g., abnormal cells) can be treated
  - Infrequent or lack of Pap smear
    - Same thing here
  - Lack of knowledge about HPV
    - Don't know how to prevent infection or what to do when infected
  - Cigarette use
    - Impacts body's ability to fight off the infection
  - History of STI's
    - Again, body's ability to fight off infection is reduced

10

What can I do?

11

How do I reduce my risk of infection?

- Limit the number of sex partners
- Engage in non-penetrative sexual acts
- Be more informed about HPV
- Get annual Pap smears
- Get Regular STI testing
- Get the HPV vaccine
  - Protects against Types 6, 11, 16 & 18
    - Will not protect you if you are already infected with that type
    - Will protect you against any of the other 4 types that you're not infected with

12

How do I reduce my risk of infection?

- Talk with partners about their sexual history
  - Including their STI testing behaviors
- Use barrier contraceptives
  - Condoms don't totally protect but they do help
  - Other methods are useful too
    - Dental dams for oral sex
    - Female condoms
  - Discuss use of barriers with potential partners to increase likelihood that you'll use them when the time comes

13

What if I'm already infected?

- Use condoms and other barrier contraceptives
  - Condoms reduce re-infection and speed of recovery from infection
  - Plus – you'll reduce the likelihood of passing on to your partner
- Vaccine still protects against types not infected with
  - VERY unlikely infected with all types

14

Do I have HPV?

15

How do I know if I have it?

- Minimal, if any, symptoms
  - Most do not know they are infected
  - Genital warts
    - This is really the only observable symptom of HPV
    - Caused by a specific type
- Detected through
  - Pap smear
    - Detects cervical abnormalities (abnormal cells)
    - IF the Pap smear is abnormal
      - They will then test specifically for presence of HPV
        - May have to run more tests to determine severity of infection

16

What do I do about the infection?

- If Pap smear detects abnormalities
  - Cryosurgery to freeze off lesions
  - LEEP to remove lesions with hot wire loop
- If warts are present
  - Frozen off
  - Surgically removed
  - Topical medication

17

I don't want HPV

But do I really have to…

18

Use condoms?

- Some say that they are
  - Inconvenient
  - Uncomfortable
  - Embarrassing to buy
    - And to bring up to sex partner
- Still…the majority of college students report that they use a condom most of the time or always when having sex

19

Go to the doctor?

- Yes, getting a Pap smear can be uncomfortable – both physically and emotionally
  - But the doctor will do everything to make you as comfortable as possible
  - And hey…all women have to do it!
- Vaccines can be uncomfortable too
  - Many people worry about the cost
  - Or they just don't know where to go

20

I just don't know if I can do all that…

- Normal to feel overwhelmed about this process
  - Especially if you have to engage in a number of changes
  - Hard to start something that seems embarrassing or overwhelming
- Can overcome this embarrassment and belief that you're not capable by PLANNING AND PRACTICING!

21

Remind me…why should I do those things?

- I'll reduce the risk of getting infected or re-infected
- I won't infect others
- I won't have to go to the doctor any more than regular visits
- I won't have to have any additional treatments
- I'll significantly reduce my chances of a severe infection (such as cancer) developing

22

OK! I'll protect myself

But where do I start and how do I do it?

23

Be prepared

- Discuss the use of contraceptives with your partner prior to getting in an intimate situation
  - If you want, just rely on the facts
    - They don't know if they are infected…neither do you
    - Best to be safe
  - What if they still say no?
    - That is a hard situation…
    - Continue to discuss with them. Do not give up
      - If your health is important to you, this is non-negotiable!

24

Be informed

- Talk with your partners about their sexual past
  - Yes…this can be hard…especially if you are nervous about the answer!
  - Remember, this is to protect yourself.
    - In order to protect your sexual health, you must be informed
      - This means knowing about your partners past – it's important to know their history of STIs so you can make an informed decision regarding your own sexual health
- As a responsible partner, you should disclose your past also
  - Allowing them to make an informed decision about their health

25

Doctor

- Pap Smears
  - Where do I go?
    - Call the Student Health Center
      - They are ready and willing
        - Cost is minimal
    - Call your insurance provider
      - They can help you figure out which location is best for you
- STI Testing
  - Where do I go?
    - Go to your local health department and they will run a full test on your FOR FREE!
- HPV Vaccine
  - Where do I go?
    - Call the Student Health Center and/or call your insurance provider
      - They can help you find out which location is best for you

26

Condoms

- Where do I get them?
  - Student Health Center – free
    - Just walk up and ask for them
  - Health Department - free
  - Any local store
    - Just put them down and pay for them
      - You should feel proud that you're taking measures to protect yourself and act responsibly
- How do I use them?
  - http://www.teachingsexualhealth.ca/teacher/resources/malecondomdemo.html

27

Female Condoms

- Where do I get them?
  - Student Health Center – free
    - Just walk up and ask for them
  - Health Department - free
  - Many local pharmacies and stores
- How do I use them?
  - http://www.teachingsexualhealth.ca/teacher/resources/femalecondomdemo.html

28

Dental Dams

- Where do I get them?
  - Student Health Center – free
    - Just walk up and ask for them
  - Health Department - free
  - Make one from a regular condom
    - Just cut the condom down the middle
- How do I use them?
  - http://www.teachingsexualhealth.ca/teacher/resources/dentaldamdemo.html

29

ANY QUESTIONS?

30


Please complete surveys before you leave
Be sure to get a card from the facilitator after filling out your surveys
31

APPENDIX H: EMAIL REMINDER SCRIPT 3-WEEKS AFTER PART 1

From: Jocelyn Sweeney
To:
CC:
BCC: student name
Subject: Reminder
Attachments:

Hello! As was mentioned when you completed the first portion of this study, I am writing to remind you that in one week, you will be emailed instructions for completing Part 2 of the study, Behaviors, through UNCC SonaSystems®. As a reminder, your participation in this study is voluntary. Thank you very much for your participation! Please contact the principal investigator, Jocelyn Sweeney, with any questions (jbrinema@uncc.edu, 980-355-9016).

Sincerely,

Jocelyn Sweeney

APPENDIX I: EMAIL SCRIPT FOR INSTRUCTIONS FOR PART 2

From: Jocelyn Sweeney
To:
CC:
BCC: student name
Subject: Code
Attachments:

Hello! As was mentioned when you completed the first portion of this study, this email is to let you know that it has been 28 days since you participated in the study titled, Behaviors Part One. It is time for you to complete Part Two. In order to do so, you will need to log onto UNCC SonaSystems® (http://uncc.sona-systems.com/default.asp), search for Behaviors Part Two. Once you have located the study, you will need to enter ZXSLH5MG to gain access to the survey. As a reminder, your participation in this study is voluntary. Please contact the principal investigator, Jocelyn Sweeney (jbrinema@uncc.edu; 980-355-9016) with any questions or concerns.

Sincerely,

Jocelyn Sweeney

APPENDIX J: EMAIL SCRIPT FOR PARTICIPANT THANKS AND CONTACT INFORMATION

From: Jocelyn Sweeney
To:
CC:
BCC: student name
Subject: Thank you
Attachments:

Thank you very much for you participation in the study, Behaviors Part 1 & 2. As mentioned in the informed consent, I am providing all participants with contact information for the UNCC Counseling Center, Health Center, and IRB, along with my information and Dr. Rick McAnulty's information. Again, this information is being sent to all participants in this study. Thank you again for your participation in this study!

Counseling Center (http://counselingcenter.uncc.edu/) – 704-687-2105
Student Health Center (http://studenthealth.uncc.edu/) – 704-687-7400
Research Compliance Office (http://research.uncc.edu/compliance-ethics) – 704-687-3309
Jocelyn Sweeney (jbrinema@uncc.edu) – 980-355-9016
Rick McAnulty, PhD (rdmcanul@uncc.edu) – 704-687-4783

Sincerely,

Jocelyn Sweeney